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MAR 19 1998

AT SEATTLE  
CLERK U.S. DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON  
DEPUTY

AT SEATTLE  
CLERK U.S. DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON  
DEPUTY

BY IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF WASHINGTON

UNITED STATES OF AMERICA

Plaintiff,

v.

CIVIL ACTION NO.

C97-14627

SEATTLE DISPOSAL COMPANY, a former  
Washington general partnership,  
and John Banchemo, Sr., Josie  
Razore and their respective  
marital communities,  
WASHINGTON WASTE HAULING  
& RECYCLING, INC., THE MONSANTO  
COMPANY, BOARD OF REGENTS OF THE  
UNIVERSITY OF WASHINGTON, LOCKHEED  
MARTIN CORPORATION, PORT OF  
SEATTLE, SEARS, ROEBUCK  
AND CO., R.W. RHINE, INC.,  
CITY OF MERCER ISLAND,  
a Municipal Corporation of  
the State of Washington, THE  
SEATTLE SCHOOL DISTRICT, AND  
QUEMETCO, INC.

Defendants.

THE TULALIP TRIBES OF  
WASHINGTON AND THE TULALIP  
SECTION 17 CORPORATION

Intervenors/Defendants  
Under Clean Water Act

TULALIP LANDFILL  
SUPERFUND SITE  
CONSENT DECREE WITH  
WASHINGTON WASTE HAULING  
& RECYCLING, INC., THE  
TULALIP SECTION 17  
CORPORATION, AND THE  
TULALIP TRIBES OF  
WASHINGTON

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1 I. BACKGROUND

2 A. The United States of America ("United States"), on  
3 behalf of the Administrator of the United States Environmental  
4 Protection Agency ("EPA"), filed a complaint in this matter  
5 pursuant to Sections 106 and 107 of the Comprehensive  
6 Environmental Response, Compensation, and Liability Act  
7 ("CERCLA"), 42 U.S.C. §§ 9606 and 9607, against Seattle Disposal  
8 Company (a former Washington general partnership), and John  
9 Banchemo, Sr., Josie Razore, and their respective marital  
10 communities, Washington Waste Hauling & Recycling, Inc. ("Waste  
11 Management"), Monsanto Company, Board of Regents of the  
12 University of Washington, Lockheed Martin Corporation, Port of  
13 Seattle, Sears, Roebuck and Co., R.W. Rhine, Inc., City of Mercer  
14 Island, the Seattle School District, and Quemetco, Inc. The  
15 United States in its Complaint also filed an action against the  
16 Tulalip Tribes of Washington and the Tulalip Section 17  
17 Corporation pursuant to Sections 301, 309 and 311 of the CWA,  
18 33 U.S.C. §§ 1311, 1319, and 1321. The Tulalip Tribes of  
19 Washington and the Tulalip Section 17 Corporation have filed a  
20 Complaint in Intervention with the Court in connection with this  
21 matter. The Tulalip Tribes of Washington is a federally  
22 recognized Indian tribe organized under Section 16 of the Indian  
23 Reorganization Act of 1934, as amended, 25 U.S.C. § 476 (IRA),  
24 and is the successor in interest to the Snohomish, Snoqualmie,  
25 Skykomish and other tribes and bands party to the Treaty of Point  
26 Elliot. The Tulalip Indian Reservation was established pursuant



1 to the Treaty of Point Elliot, as implemented by Executive Order.  
2 The site of the landfill is held by the United States in trust.  
3 The Tulalip Section 17 Corporation, a federal corporation  
4 chartered pursuant to Section 17 of the Indian Reorganization  
5 Act, as amended, 25 U.S.C. § 477, is the trust beneficiary of the  
6 westerly parcel, which was accepted in trust by the United States  
7 in 1960. The Tulalip Tribes of Washington, the tribal  
8 government, is the trust beneficiary of the easterly parcel,  
9 which was accepted in trust by the United States in 1971.  
10 Neither the Tulalip Tribes Section 17 Corporation nor the Tulalip  
11 Tribes of Washington have been named by EPA as liable parties at  
12 the Site under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

13 B. The United States in its complaint seeks,  
14 inter alia: (1) reimbursement of costs incurred by EPA and the  
15 Department of Justice for response actions at the Tulalip  
16 Landfill Superfund Site in Marysville, Washington, together with  
17 accrued interest; (2) civil penalties and injunctive relief under  
18 the Clean Water Act; and (3) performance of studies and response  
19 work by the Defendants at the Site consistent with the National  
20 Oil and Hazardous Substance Pollution Contingency Plan, 40 C.F.R.  
21 Part 300 (as amended) ("NCP").

22 C. The Tulalip Tribes and Waste Management have asked  
23 that the United States Department of the Interior, Bureau of  
24 Indian Affairs ("BIA"), sign this Decree for the purpose of  
25 authorizing access to the Site as specified in Section X (Access  
26 and Institutional Controls), to the extent that BIA has authority



1 to grant such access. BIA does not concede that it has authority  
2 to provide access to the Site or that its approval is necessary  
3 to provide such access, and BIA's signing of this Decree shall  
4 not be construed as an admission or concession that it has such  
5 authority or that its approval is required. BIA agrees to sign  
6 this Decree only for the purpose of granting any rights of access  
7 it may be deemed to have to the Site in order to effectuate the  
8 settlements embodied in this Decree, the SDC Defendants Consent  
9 Decree and the Generator Defendants Consent Decree. In addition,  
10 nothing in this Consent Decree shall be construed as an admission  
11 of any BIA or any other Settling Federal Agency liability at the  
12 Site. Any potential CERCLA liability that BIA or any other  
13 Settling Federal Agency may have at the Site will be resolved in  
14 the Generator Defendants Consent Decree, lodged and entered in  
15 the United States District Court for the Western District of  
16 Washington.

17 D. In accordance with the NCP and Section  
18 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified  
19 the State of Washington (the "State") of negotiations with  
20 potentially responsible parties ("PRPs") regarding the  
21 implementation of the remedial design and Interim Remedial Action  
22 for the Site.

23 E. In accordance with Section 122(j)(1) of CERCLA,  
24 42 U.S.C. § 9622(j)(1), EPA notified the United States Department  
25 of the Interior-Bureau of Indian Affairs, the United States Fish  
26 and Wildlife Service, the United States Department of Commerce,



1 the State of Washington Department of Ecology, and the Tulalip  
2 Tribes of Washington of negotiations with PRPs regarding the  
3 release of hazardous substances that may have resulted in injury  
4 to the natural resources under Federal trusteeship.

5 F. Waste Management and the Tulalip Tribes of  
6 Washington and the Tulalip Section 17 Corporation do not admit  
7 any liability arising out of the transactions or occurrences  
8 alleged or that could have been alleged in the Complaint, nor do  
9 they acknowledge that the release or threatened release of  
10 hazardous substances at or from the Site constitutes an imminent  
11 or substantial endangerment to the public health or welfare or  
12 the environment.

13 G. Pursuant to Section 105 of CERCLA, 42 U.S.C.  
14 § 9605, EPA placed the Site on the National Priorities List  
15 ("NPL"), set forth at 40 C.F.R. Part 300, Appendix B, by  
16 publication in the Federal Register on April 25, 1995,  
17 60 Fed. Reg. 20330.

18 H. In response to a release or a substantial threat  
19 of a release of hazardous substances at or from the Site, Waste  
20 Management and other PRPs at the Site commenced in August 1993 a  
21 Remedial Investigation and Feasibility Study ("RI/FS") for the  
22 Site pursuant to 40 C.F.R. § 300.430.

23 I. Waste Management and other PRPs at the Site  
24 completed a Remedial Investigation ("RI") Report for the On-  
25 Source and Off-Source Areas of the Site, and a Feasibility Study  
26 ("FS") for the On-Source Areas of the Site on May 4, 1995.



1 J. Pursuant to Section 117 of CERCLA, 42 U.S.C.  
2 § 9617, EPA published notice of the completion of the On-Source  
3 Area FS and of the proposed plan for Interim remedial action on  
4 August 4, 1995, in a major local newspaper of general  
5 circulation. EPA provided an opportunity for written and oral  
6 comments from the public on the proposed plan for Interim  
7 remedial action. A copy of the transcript of the public meeting  
8 is available to the public as part of the administrative record  
9 upon which the Regional Administrator based the selection of the  
10 Interim Remedial Action.

11 K. The decision by EPA on the Interim Remedial Action  
12 to be implemented at the Site is embodied in an Interim Record of  
13 Decision ("Interim ROD"), executed on March 1, 1996, on which the  
14 State has given its concurrence. The Interim ROD includes a  
15 responsiveness summary to the public comments. Notice of the  
16 final Interim plan for the On-Source Areas of the Site was  
17 published in accordance with Section 117(b) of CERCLA, 42 U.S.C.  
18 § 9607(b).

19 L. Based on the information presently available to  
20 EPA, EPA believes that the Work will be properly and promptly  
21 conducted by the Settling Parties if conducted in accordance with  
22 the requirements of this Consent Decree and its appendices.

23 M. For the purposes of Section 113(j) of CERCLA,  
24 42 U.S.C. § 9613(j), among other purposes, the Interim Remedial  
25 Action selected by the Interim ROD and the Work to be performed  
26



1 by the Settling Parties shall constitute a response action taken  
2 or ordered by the President.

3 N. The Parties recognize, and the Court by entering  
4 this Consent Decree finds, that this Consent Decree has been  
5 negotiated by the Parties in good faith and implementation of  
6 this Consent Decree will expedite the cleanup of the Site and  
7 will avoid prolonged and complicated litigation between the  
8 Parties, and that this Consent Decree is fair, reasonable, and in  
9 the public interest.

10  
11 NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

12  
13 II. JURISDICTION

14 1. This Court has jurisdiction over the subject  
15 matter of this action pursuant to 28 U.S.C. §§ 1331, 1345 and  
16 1355, 33 U.S.C. § 1319(b), 42 U.S.C. § 6973, and 42 U.S.C.  
17 §§ 9606, 9607, and 9613(b).

18 a. The Complaint alleges that this Court has  
19 jurisdiction over the subject matter of this action pursuant to  
20 28 U.S.C. §§ 1331, 1345 and 1355, 33 U.S.C. §§ 1319(b), and  
21 42 U.S.C. §§ 9606, 9607 and 9613(b), and personal jurisdiction  
22 under the CWA over the Tulalip Tribes of Washington and the  
23 Tulalip Section 17 Corporation. Upon the Court granting its  
24 Complaint in Intervention, this Court will also have personal  
25 jurisdiction under CERCLA over the Tulalip Tribes of Washington  
26 and the Tulalip Section 17 Corporation as provided herein.



1 Without admitting liability under CERCLA, the Tulalip Tribes of  
2 Washington and the Tulalip Section 17 Corporation hereby (1)  
3 waive their sovereign immunity solely for the limited purpose of  
4 allowing the entry of this Consent Decree and the enforcement of  
5 its terms by this Court and for the limited purpose of allowing  
6 Waste Management to seek judicial relief pursuant to subparagraph  
7 1.c. herein, and not otherwise, (2) consent to such entry and  
8 enforcement of this Consent Decree, and (3) agree not to  
9 challenge the terms of this Consent Decree, this Court's personal  
10 or subject matter jurisdiction to enter and enforce this Consent  
11 Decree, or venue in this District. This consent to the entry and  
12 enforcement of this Consent Decree shall not be deemed an  
13 admission of liability under CERCLA by the Tulalip Tribes of  
14 Washington or the Tulalip Section 17 Corporation. Neither the  
15 consent to the entry and enforcement of this Consent Decree nor  
16 the aforesaid waiver of sovereign immunity shall be construed as  
17 impairing, modifying, diminishing, enlarging, or otherwise  
18 affecting the treaty rights of the Tulalip Tribes of Washington  
19 or the Tulalip Section 17 Corporation, or, except as expressly  
20 limited herein, their sovereign immunity.

21           b. This Court also has personal jurisdiction over  
22 Waste Management under CERCLA. Solely for the purposes of this  
23 Consent Decree and the underlying complaint and the Tulalip  
24 Tribes of Washington's Complaint in Intervention, Waste  
25 Management waives all objections and defenses that it may have to  
26 jurisdiction of the Court or to venue in this District. Waste



1 Management shall not challenge the entry of this Consent Decree,  
2 the standing of the Tulalip Tribes of Washington to intervene, or  
3 this Court's jurisdiction to grant the Tulalip Tribes of  
4 Washington's intervention, or this Court's jurisdiction to enter  
5 and enforce this Consent Decree.

6 c. Without admitting liability under CERCLA, the  
7 Tulalip Tribes of Washington and the Tulalip Section 17  
8 Corporation hereby waive their sovereign immunity solely for the  
9 limited purpose of allowing Waste Management to seek judicial  
10 relief to recover damages that may arise due to negligent or  
11 wrongful actions of either the Tulalip Tribes of Washington or  
12 the Tulalip Section 17 Corporation under Section X (Access and  
13 Institutional Controls) or Section XVIII (Emergency Response) of  
14 this Consent Decree, provided that this limited waiver will apply  
15 only to damages that result from such negligent or wrongful  
16 actions as defined and limited herein and that occur during the  
17 time of Waste Management's performance of Work under this Consent  
18 Decree, and not otherwise. This limited waiver of sovereign  
19 immunity for the limited purposes set forth herein is not  
20 intended and may not be construed as an admission of liability or  
21 as a waiver of any defenses with respect to any action brought by  
22 Waste Management against either the Tulalip Tribes of Washington  
23 or the Tulalip Section 17 Corporation. This limited waiver of  
24 sovereign immunity shall be construed to apply only to authorized  
25 actions of the Tulalip Tribes of Washington or the Tulalip  
26 Section 17 Corporation or the actions of its agents, employees,



1 officers, directors or other representatives acting in their  
2 official and authorized capacity. This limited waiver shall not  
3 apply to any claim for damages based on an allegation that the  
4 Tulalip Tribes of Washington or the Tulalip Section 17  
5 Corporation or the agents, employees, officers, directors or  
6 other representatives of either, failed to take action with  
7 respect to the presence of hazardous substances, pollutants,  
8 contaminants or any other conditions at the Site, known or  
9 unknown, except such actions as may be specifically required  
10 under Section X (Access and Institutional Controls) or Section  
11 XVIII (Emergency Response) of this Consent Decree.

12 III. PARTIES BOUND

13 2. This Consent Decree applies to and is binding upon  
14 the United States, upon Waste Management, and upon the Tulalip  
15 Tribes of Washington and the Tulalip Section 17 Corporation  
16 (together, "the Tulalip Tribes") and their successors and  
17 assigns. Any change in ownership or corporate status of either  
18 Waste Management or the Tulalip Tribes, including, but not  
19 limited to, any transfer of assets or real or personal property,  
20 shall in no way alter either Waste Management's or the Tulalip  
21 Tribes' responsibilities under this Consent Decree.

22 3. Each Settlor shall provide a copy of this Consent  
23 Decree to each contractor hired by it to perform the Work (as  
24 defined below) required by this Consent Decree and to each person  
25 representing a Settlor with respect to the Site or the Work and  
26 shall condition all contracts entered into hereunder upon



1 performance of the Work in conformity with the terms of this  
2 Consent Decree. Each Settlor or its contractors shall provide  
3 written notice of the Consent Decree to all subcontractors hired  
4 to perform any portion of the Work required by this Consent  
5 Decree. Each Settlor shall nonetheless be responsible for  
6 ensuring that its contractors and subcontractors perform the Work  
7 contemplated herein in accordance with this Consent Decree. With  
8 regard to the activities undertaken pursuant to this Consent  
9 Decree, each contractor and subcontractor performing work for  
10 either Settlor shall be deemed to be in a contractual  
11 relationship with that Settlor, as applicable, within the meaning  
12 of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

#### 13 IV. DEFINITIONS

14 4. Unless otherwise expressly provided herein, terms  
15 used in this Consent Decree which are defined in CERCLA or in  
16 regulations promulgated under CERCLA shall have the meaning  
17 assigned to them in CERCLA or in such regulations. Whenever  
18 terms listed below are used in this Consent Decree or in the  
19 appendices attached hereto and incorporated hereunder, the  
20 following definitions shall apply:

21 A. "Additional Response Costs" shall mean those costs  
22 that the United States incurs pursuant to Section X (Access and  
23 Institutional Controls) for payment of fair market value of  
24 access rights taken or to secure institutional controls  
25 (excluding attorney's fees), Section XVIII (Emergency Response),  
26



1 and Paragraph 134 of Section XXIV (Covenants Not To Sue By  
2 Plaintiff) of this Decree;

3 B. "Administrative Order on Consent for RI/FS" or "AOC  
4 for RI/FS" shall mean the Administrative Order on Consent for the  
5 Remedial Investigation and Feasibility Study for the On-Source  
6 Areas of the Site which was signed by EPA on August 12, 1993, and  
7 to which Generator Defendants Monsanto Company and the Port of  
8 Seattle, as well as Waste Management, are signatories;

9 C. "Administrative Order on Consent" or "AOC" shall  
10 mean the Administrative Order on Consent entered into by EPA and  
11 Waste Management for purposes of beginning Remedial Design and  
12 Site stabilization and Site preparation work. This AOC is  
13 attached as Appendix F to this Consent Decree;

14 D. "CERCLA" shall mean the Comprehensive  
15 Environmental Response, Compensation, and Liability Act of 1980,  
16 as amended, 42 U.S.C. §§ 9601, et seq. as the same may be amended  
17 or superseded;

18 E. "Clean Water Act" or "CWA" shall mean the Federal  
19 Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.  
20 as the same may be amended or superseded;

21 F. "Consent Decree" shall mean this Decree and all  
22 appendices attached hereto (listed in Section XXXII). In the  
23 event of conflict between this Decree and any appendix, this  
24 Decree shall control;

25 G. "Day" shall mean a calendar day unless expressly  
26 stated to be a working day. "Working day" shall mean a day other



1 than a Saturday, Sunday, or federal holiday. In computing any  
2 period of time under this Consent Decree, where the last day  
3 would fall on a Saturday, Sunday, or federal holiday, the period  
4 shall run until the close of business of the next Working Day;

5 H. "EPA" shall mean the United States Environmental  
6 Protection Agency and any successor departments or agencies of  
7 the United States;

8 I. "Generator Defendants" shall mean Monsanto  
9 Company, Board of Regents of the University of Washington,  
10 Lockheed Martin Corporation, Port of Seattle, Sears, Roebuck and  
11 Co., R.W. Rhine, Inc., City of Mercer Island, Quemetco, Inc., and  
12 the Seattle School District;

13 J. "Generator Defendants Consent Decree" shall mean  
14 the Consent Decree between the United States, including the  
15 Settling Federal Agencies identified in Appendix D of this  
16 Decree, and Monsanto Company, Board of Regents of the University  
17 of Washington, Lockheed Martin Corporation, Port of Seattle,  
18 Sears, Roebuck and Co., R.W. Rhine, Inc., City of Mercer Island  
19 (a municipal corporation of the state of Washington), the Seattle  
20 School District, and Quemetco, Inc. The Generator Defendants  
21 Consent Decree is attached as Appendix G to this Decree;

22 K. "Interest" shall mean interest at the rate  
23 specified for interest on investments of the Hazardous Substance  
24 Superfund established under Subchapter A of Chapter 98 of  
25 Title 26 of the U.S. Code, in accordance with 42 U.S.C.  
26 § 9607(a);



1 L. "Interest Accrued" shall mean the amount of  
2 Interest which accrues on payments owed to the United States in  
3 the manner specified in Paragraph 74 of this Decree;

4 M. "Interim Record of Decision" or "Interim ROD"  
5 shall mean the EPA Interim Record of Decision relating to the  
6 Tulalip Landfill Superfund Site signed on March 1, 1996, by the  
7 Regional Administrator, EPA Region 10, and all attachments  
8 thereto. As of the date of entry of this Consent Decree, the  
9 Parties agree that the selected Interim Remedial Action, if  
10 properly constructed and maintained, is likely to be protective  
11 of human health and the environment. The Interim ROD is attached  
12 as Appendix A;

13 N. "Interim Remedial Action" shall mean those  
14 activities to be undertaken by Waste Management and its  
15 subcontractors and delegates to construct the cover system which  
16 is part of the remedy selected in the Interim ROD and those  
17 activities undertaken by Waste Management and/or the Tulalip  
18 Tribes and their subcontractors and delegates to perform O&M for  
19 the On-Source Areas of the Site, in accordance with the SOW and  
20 the final Remedial Design/Remedial Action Work Plan and other  
21 plans approved by EPA. The term "cover system" is a subset of  
22 the Interim Remedial Action and describes the landfill cover  
23 system that Waste Management shall construct over the On-Source  
24 Areas of the Site under this Decree;



1 O. "Landfill Berm" shall mean the berm denoted as  
2 "Landfill Berm" in Appendix C of this Consent Decree, and shall  
3 extend to the outer toe of the Landfill Berm;

4 P. "Morelli Family" shall include the Estate of Tito  
5 O. Morelli, Ida Morelli, as Personal Representative of the Estate  
6 of Tito O. Morelli, Ida Morelli in her individual capacity, Anna  
7 Morelli Armstrong, Tina Maria Morelli, Gabriel M. Morelli,  
8 Clorinda Morelli Edson, Emilia Morelli Di Corpo, individually,  
9 Nello C. and Emilia G. Di Corpo, Trustees of the Nello C. and  
10 Emilia G. Di Corpo Revocable Estate Trust Agreement dated January  
11 16, 1991, Albarosa Morelli, Panfilo S. Morelli, Dante E. Morelli,  
12 Robert D. Morelli, Elisa M. Kokesh, Panfilo S. Morelli and Elisa  
13 M. Kokesh as Trustees of the Trust under the Will of Silvio  
14 Morelli, Marion V. Larson, Executor of the Estate of Tito T.  
15 Morelli, any spouse, marital community or descendant(s) of any  
16 person heretofore named, the Morelli Brothers partnership, and  
17 the Morelli Brothers II partnership;

18 Q. "National Contingency Plan" or "NCP" shall mean  
19 the National Oil and Hazardous Substances Pollution Contingency  
20 Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C.  
21 § 9605, codified at 40 C.F.R. Part 300, including, but not  
22 limited to, any amendments or superseding regulations related  
23 thereto;

24 R. "Off-Source Areas" of the Site shall mean the  
25 environmentally sensitive wetlands located outside and adjacent  
26 to the On-Source Areas of the Site which are denoted as "Off-



1 Source Areas" in Appendix C of this Consent Decree. These Off-  
2 Source Areas extend in a northerly direction from the Landfill  
3 Berm to Ebey Slough; in a southerly direction from the Landfill  
4 Berm to Steamboat Slough; in a westerly direction from the  
5 Landfill Berm to Puget Sound; and in an easterly direction from  
6 the Landfill Berm to Interstate 5;

7 S. "On-Source Areas" of the Site shall mean the 147  
8 acres located within and including the Landfill Berm;

9 T. "Operation and Maintenance" or "O&M" shall mean  
10 all activities required under this Decree to maintain the  
11 integrity of the Interim Remedial Action as required under the  
12 Operation and Maintenance Plan approved or developed by EPA  
13 pursuant to this Consent Decree and the Statement of Work  
14 ("SOW");

15 U. "Paragraph" shall mean a portion of this Consent  
16 Decree identified by an Arabic numeral or an upper case letter;

17 V. "Parties" shall mean the United States, Waste  
18 Management, and the Tulalip Tribes;

19 W. "Past Response Costs" shall mean all costs  
20 including, but not limited to, direct and indirect costs, that  
21 the United States paid at or in connection with the Site through  
22 September 1, 1995;

23 X. "Performance Standards" shall mean the cleanup  
24 standards and other measures of achievement of the goals of the  
25 Interim Remedial Action including, but not limited to, those set  
26 forth in Section 10.1 of the Interim ROD and as further



1 delineated in the SOW. The Parties recognize and agree that the  
2 requirement that the Interim Remedial Action minimize the  
3 migration of liquids through the landfill as specified in the  
4 Interim ROD and as further delineated in the SOW pertains to  
5 infiltration of precipitation through the landfill cover system  
6 and shall not be construed as requiring the elimination of  
7 leachate seeps for purposes of determining compliance with the  
8 Performance Standards;

9 Y. "Plaintiff" shall mean the United States;

10 Z. "Project Manager" shall mean the principal  
11 person(s) retained by Waste Management and the Tulalip Tribes to  
12 supervise and direct the implementation of the Work under this  
13 Consent Decree;

14 aa. "RCRA" shall mean the Solid Waste Disposal Act, as  
15 amended, 42 U.S.C. §§ 6901, et seq. (also known as the Resource  
16 Conservation and Recovery Act) as the same may be amended or  
17 superseded;

18 bb. "Related Entities" as the term refers to SDC  
19 Defendants shall mean SDC Defendants and their heirs, any heirs'  
20 spouses, and their marital communities, successors, and assigns,  
21 the SDC Defendants' past, present, and future officers and  
22 directors who have acted or are acting in those capacities, and  
23 where the SDC Defendant is a corporate entity, its corporate  
24 successors to potential liability for the Tulalip Landfill Site.  
25 "Related Entities" shall also mean the following named entities  
26 associated with one or more of the SDC Defendants: the Morelli



1 Family and those entities identified in Appendix C of the SDC  
2 Defendants Consent Decree, attached hereto as Appendix G;

3 cc. "Related Entities" as the term relates to the  
4 Generator Defendants shall mean (a) the heirs, successors, and  
5 assigns of the Generator Defendants; and (b) their past, present,  
6 and future officers and directors who have acted or are acting in  
7 those capacities, and where a Related Entity is a corporate  
8 entity, its successors to potential liability for the Tulalip  
9 Landfill Site;

10 dd. "Related Entities" as the term relates to Waste  
11 Management and the Tulalip Tribes shall mean Waste Management and  
12 the Tulalip Tribes and their heirs, successors, and assigns,  
13 Waste Management's and the Tulalip Tribes' past, present, and  
14 future officers and directors who have acted or are acting in  
15 those capacities, and Waste Management's corporate successors to  
16 potential liability for the Tulalip Landfill Site. "Related  
17 Entities" shall also mean the following named entities associated  
18 with Waste Management:

19 Related Entities of Washington Waste Hauling & Recycling,  
20 Inc. (currently known as Waste Management, Inc.):

21 Apex Garbage Co., Inc.  
22 Bayside Waste Hauling and Transfer Co., Inc.  
23 Container Hauling Corporation  
24 Eastside Disposal Co., Inc.  
25 Bruce J. Leven  
26 Nancy Meyer Leven  
27 National Disposal Contractors, Inc. (does not include any  
28 liability that Browning-Ferris Industries of Illinois might  
have at the Site related to its prior ownership of National  
Disposal)  
Universal Refuse Removal Co., Inc.  
Waste Management, Inc.



1 WMX Technologies, Inc.  
2 Industrial Transport  
3 Northwest Garbage Company, Inc.  
4 SnoKing Garbage Company, Inc.

5 ee. "Remedial Design/Remedial Action Work Plan" or  
6 "RD/RA Work Plan" shall mean the document developed pursuant to  
7 Paragraphs 10 and 11 of this Consent Decree and approved by EPA,  
8 and any amendments thereto;

9 ff. "Remedial Design" shall mean those activities to  
10 be undertaken by Waste Management to develop the final plans and  
11 specifications for the Interim Remedial Action pursuant to the  
12 Remedial Design portion of the RD/RA Work Plan;

13 gg. "Remedial Design Work Plan" shall mean the  
14 document developed pursuant to Paragraph 11 of this Consent  
15 Decree and approved by EPA, and any amendments thereto;

16 hh. "Response Costs" shall mean all expenses, costs,  
17 and disbursements, direct and indirect, incurred or to be  
18 incurred by the United States, the Tulalip Tribes, or any person  
19 or entity for response activities, including investigation,  
20 oversight, removal or remedial actions, and all administrative  
21 and enforcement activities with respect to the Site including,  
22 without limitation: (1) past costs incurred prior to entry of  
23 this Consent Decree; however, with respect to Waste Management  
24 only, the term "Response Costs" excludes those past costs related  
25 to the AOC for RI/FS; (2) all costs for implementing, developing,  
26 performing, overseeing or verifying any investigatory or response  
27 activities at the Site, including the Interim Remedial Action



1 requirements of this Consent Decree; and (3) any other or future  
2 response costs incurred in connection with the Site after entry  
3 of this Consent Decree, including O&M; however, with respect to  
4 Waste Management only, the term "Response Costs" excludes those  
5 future costs related to the AOC for RI/FS;

6 ii. "SDC Defendants" shall mean Seattle Disposal  
7 Company (a former Washington general partnership), John Banchemo,  
8 Sr., Josie Razore, and their respective marital communities;

9 jj. "SDC Defendants Consent Decree" shall mean the  
10 Consent Decree between the United States and Seattle Disposal  
11 Company (a former Washington general partnership), John Banchemo,  
12 Sr., Josie Razore and their respective marital communities. The  
13 SDC Defendants Consent Decree is attached as Appendix G to this  
14 Decree;

15 kk. "Section" shall mean a portion of this Consent  
16 Decree identified by a Roman numeral;

17 ll. "Settling Federal Agencies" shall mean those  
18 departments, agencies and instrumentalities of the United States  
19 identified in Appendix D to this Consent Decree;

20 mm. "Settlor(s)" or "Settling Party(ies)" shall mean  
21 Waste Management and the Tulalip Tribes;

22 nn. "Site" shall mean the Tulalip Landfill Superfund  
23 Site, located on Ebey Island between Steamboat Slough and Ebey  
24 Slough in the Snohomish River delta system between Everett and  
25 Marysville, Washington. The Site, depicted generally on the map  
26 attached as Appendix C, is located largely within the Tulalip



1 Indian Reservation, which includes the "On-Source Areas", the  
2 "Off-Source Areas", the areas immediately adjacent to the  
3 landfill necessary to develop access to and from the landfill for  
4 the purposes of implementing the Interim Remedial Action, the  
5 areal extent of contamination that originated in the Tulalip  
6 Landfill and is presently located in the vicinity of the Tulalip  
7 Landfill, and all suitable areas in close proximity to the  
8 contamination necessary for the implementation of the response  
9 actions;

10 oo. "State" shall mean the State of Washington;

11 pp. "Statement of Work" or "SOW" shall mean the  
12 statement of work for implementation of the Remedial Design,  
13 Interim Remedial Action, and Operation and Maintenance at the  
14 Site, as set forth in Appendix B to this Consent Decree and any  
15 modifications made in accordance with this Consent Decree;

16 qq. "Tulalip Tribes" shall refer collectively to the  
17 Tulalip Tribes of Washington (a federally recognized Indian tribe  
18 organized under Section 16 of the Indian Reorganization Act (IRA)  
19 of 1934, as amended, 25 U.S.C. § 476), and its successors and  
20 assigns, and the Tulalip Section 17 Corporation (a federal  
21 corporation chartered as "The Tulalip Tribes" on September 8,  
22 1936, and ratified on October 3, 1936, pursuant to Section 17 of  
23 the IRA, as amended, 25 U.S.C. § 477), and the Tulalip Section 17  
24 Corporation's assigns or corporate successors. The Tulalip  
25 Tribes of Washington and the Tulalip Section 17 Corporation,  
26 while not named by EPA as liable parties under CERCLA at the



1 Site, have filed a Complaint in Intervention and are signatories  
2 to this Decree for the purpose of resolving their potential  
3 liability under CERCLA and performing their obligations specified  
4 under this Decree;

5 rr. "United States" shall mean the United States of  
6 America, including all of its departments, agencies, and  
7 instrumentalities;

8 ss. "Waste Management" shall mean Washington Waste  
9 Hauling & Recycling, Inc., its successors and assigns;

10 tt. "Waste Material" shall mean (1) any "hazardous  
11 substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14);  
12 (2) any pollutant or contaminant under Section 101(33), 42 U.S.C.  
13 § 9601(33); (3) any "solid waste" under Section 1004(27) of RCRA,  
14 42 U.S.C. § 6903(27); (4) any "dangerous waste" under Chapter  
15 70.105 of the Revised Code of Washington and its implementing  
16 regulations codified in Chapter 173-303 of the State of  
17 Washington Administrative Code ("WAC"); and any "solid waste"  
18 under Chapter 70.95 of the Revised Code of Washington and its  
19 implementing regulations codified at Chapter 173-304 of the WAC;  
20 and

21 uu. "Work" shall mean all activities Waste Management  
22 and the Tulalip Tribes are required to perform under this Consent  
23 Decree, except those required by Section XXVIII (Retention of  
24 Records).



1 V. GENERAL PROVISIONS

2 5. Objectives of the Parties

3 a. The objectives of the Parties in entering into this  
4 Consent Decree are to protect public health or welfare or the  
5 environment at the Site by the design and implementation of  
6 response actions at the Site by the Settlers, to reimburse  
7 response costs of the Plaintiff as specified herein, and to  
8 resolve the claims and potential claims of Plaintiff against the  
9 Settlers as provided in this Consent Decree.

10 b. Upon entry of this Consent Decree by the Court,  
11 the Administrative Order on Consent between EPA and Waste  
12 Management shall terminate and will be superseded by this Consent  
13 Decree. All Work Plans, design specifications, or other plans,  
14 reports or schedules, as approved by EPA pursuant to that Order,  
15 shall be incorporated by reference into and shall be enforceable  
16 under this Consent Decree.

17 6. Commitments by Settlers

18 a. Each Settler shall perform applicable portions of  
19 the Work as specified in this Consent Decree, the Interim ROD,  
20 the SOW, and all Work Plans and other plans, standards,  
21 specifications, and schedules set forth herein or developed by  
22 the Settlers and approved by EPA pursuant to this Consent Decree.

23 b. Except as provided in this Consent Decree, in  
24 general, Waste Management is obligated to design and construct  
25 the remedy selected in the Interim ROD, and perform the initial  
26 phases of the Operation and Maintenance as specified in the SOW,



1 the RD/RA Work Plan, and the O&M Work Plan, and the Tulalip  
2 Tribes are obligated to pay amounts owed to the United States and  
3 perform the Operations and Maintenance as specified in the SOW,  
4 the RD/RA Work Plan, and the O&M Work Plan.

5 7. Compliance With Applicable Law

6 For those activities performed, the Settlers must  
7 comply with all applicable or relevant and appropriate  
8 requirements of all environmental laws as set forth in the  
9 Interim ROD and the SOW. The activities conducted pursuant to  
10 this Consent Decree, if approved by EPA, shall be considered to  
11 be consistent with the NCP.

12 8. Permits

13 a. As provided in Section 121(e) of CERCLA, 42 U.S.C.  
14 § 9621(e), and Section 300.400(e) of the NCP, no permit shall be  
15 required for any portion of the Work conducted entirely on-Site  
16 (i.e., within the areal extent of contamination or in close  
17 proximity to the contamination and necessary for implementation  
18 of the Work). Where any portion of the Work that is not on-Site  
19 requires a federal or state permit or approval, each Settlor, as  
20 applicable, shall submit timely and complete applications and  
21 take all other actions necessary to obtain all such permits or  
22 approvals for its Work.

23 b. Settlers may seek relief under the provisions of  
24 Section XXI (Force Majeure) of this Consent Decree for any delay  
25 in the performance of the Work resulting from a permitting  
26



1 agency's failure to issue, or a delay in issuance of, any permit  
2 required for the Work.

3 c. This Consent Decree is not, and shall not be  
4 construed to be, a permit issued pursuant to any federal, tribal  
5 or state statute or regulation.

6 9. Notice of Obligations to Successors-in-Title

7 a. Within fifteen (15) days after the entry of this  
8 Consent Decree, the Tulalip Tribes shall record a certified copy  
9 of this Consent Decree with the title plant located at the  
10 offices of the BIA in Portland, Oregon. Thereafter, each deed,  
11 title, or other instrument conveying an interest in the property  
12 included in the Site shall contain a notice stating that the  
13 property is subject to this Consent Decree and shall reference  
14 the recorded location of the Consent Decree and any restrictions  
15 applicable to the property under this Consent Decree.

16 b. The obligations of the Tulalip Tribes with respect  
17 to the provision of access under Section X (Access and  
18 Institutional Controls) and the implementation of institutional  
19 controls under Section X shall be binding upon the Tulalip Tribes  
20 and any and all persons who subsequently acquire any such  
21 interest or portion thereof (hereinafter "Successors-in-Title").  
22 Within fifteen (15) days after the entry of this Consent Decree,  
23 the Tulalip Tribes shall record at the title plant located at the  
24 offices of the BIA in Portland, Oregon, a notice of obligation to  
25 provide access under Section X (Access and Institutional  
26 Controls) and related covenants, if any. Each subsequent



1 instrument conveying an interest to any such property included in  
2 the Site shall reference the recorded location of such notice and  
3 covenants applicable to the property.

4           c.     The Tulalip Tribes and any Successor-in-Title  
5 shall, at least thirty (30) days prior to the conveyance of any  
6 such interest, give written notice of this Consent Decree to the  
7 grantee and written notice to EPA of the proposed conveyance,  
8 including the name and address of the grantee, and the date on  
9 which notice of the Consent Decree was given to the grantee. In  
10 the event of any such conveyance, the Tulalip Tribes' obligations  
11 under this Consent Decree, including their obligation to provide  
12 or secure access pursuant to Section X, shall continue to be met  
13 by the Tulalip Tribes. In addition, if the United States  
14 approves, the grantee may perform some or all of the Work under  
15 this Consent Decree. In no event shall the conveyance of an  
16 interest (in property that includes, or is a portion of, the  
17 Site) release or otherwise affect the obligation of the Tulalip  
18 Tribes to comply with the Consent Decree.

19           VI.   PERFORMANCE OF THE INTERIM REMEDIAL ACTION

20           10.   Unless previously submitted, within thirty (30)  
21 days after EPA issues an authorization to proceed with Remedial  
22 Design, Waste Management shall submit a Work Plan for the  
23 Remedial Design and Interim Remedial Action at the Site  
24 ("Remedial Design/Remedial Action Work Plan" or "RD/RA Work  
25 Plan") to EPA for review and approval. The RD/RA Work Plan shall  
26 include a step-by-step plan for completing the remedial design



1 and remedial action for the Interim Remedial Action described in  
2 the Interim ROD and for attaining and maintaining all  
3 requirements, including Performance Standards, identified in the  
4 Interim ROD and as further delineated in the SOW. The RD/RA Work  
5 Plan must describe in detail the tasks and deliverables Waste  
6 Management will complete during the remedial design and remedial  
7 action phases, and a schedule for completing the tasks and  
8 deliverables in the RD/RA Work Plan.

9           11. The RD/RA Work Plan shall contain, at a minimum,  
10 the following plans: Design Sampling and Analysis Plan, Field  
11 Investigation Quality Assurance Project Plan, Health and Safety  
12 Plan, Contingency Plan, and a Site Management Plan. The Site  
13 Health and Safety Plan shall conform to the applicable  
14 Occupational Safety and Health Administration and EPA  
15 requirements, including, but not limited to, those found at  
16 54 Fed. Reg. 9294.

17           12. Upon approval by EPA under this Decree, the RD/RA  
18 Work Plan is incorporated into this Consent Decree as a  
19 requirement of this Consent Decree and shall be an enforceable  
20 part of this Consent Decree. Upon approval of the RD/RA Work  
21 Plan by EPA, Waste Management shall implement the RD/RA Work Plan  
22 according to the schedule in the approved RD/RA Work Plan. Any  
23 violation of the approved RD/RA Work Plan shall be a violation of  
24 this Consent Decree. Unless otherwise directed by EPA, Waste  
25 Management shall not perform further Work at the Site prior to  
26 EPA's written approval of the RD/RA Work Plan.



1                                   A. Remedial Design

2                   13. The RD portion of the RD/RA Work Plan shall be  
3 consistent with, and shall provide for implementing the Statement  
4 of Work, and shall comport with EPA's "Superfund Remedial Design  
5 and Remedial Action Guidance, OSWER Directive 9355.0-4A".

6                   14. Pursuant to the schedules and procedures contained  
7 in the SOW attached as Appendix B to this Consent Decree, Waste  
8 Management shall submit a Preliminary Design and a Pre-  
9 Final/Final Design to EPA for review and approval. The  
10 Preliminary Design submittal shall include, at a minimum, the  
11 following: (1) design criteria; (2) detailed grading and erosion  
12 control plan; (3) results of additional field sampling; (4)  
13 drainage plan; (5) preliminary plans, drawings, and sketches; (6)  
14 required specifications in outline form; and (7) the remaining RA  
15 support plans in outline form. This submission format may be  
16 modified after EPA approval to accommodate phased implementation  
17 of the Work.

18                   15. The Pre-Final/Final Design submittal shall include  
19 plans and specifications ready for procurement and implementation  
20 by Waste Management, and calculations and/or modeling supporting  
21 the design. The Pre-Final/Final Design submittal shall also  
22 include, at a minimum, the following: (1) final plans,  
23 specifications, and supporting calculations; (2) an Operations  
24 and Maintenance Plan; (3) the Construction Quality Assurance Plan  
25 ("CQAP"); (4) the Regrading Erosion Control Plan; (5) Well  
26 Abandonment Plan; (6) Monitoring Well Installation Plan; (7) Post



1 Construction Monitoring Plan; and (8) Institutional Controls  
2 Plan.

3 B. Interim Remedial Action

4 16. The Interim Remedial Action ("RA") portion of the  
5 RD/RA Work Plan shall be developed in accordance with the Interim  
6 ROD, and the attached Statement of Work, and shall be consistent  
7 or updated to be consistent with the Final Design as approved by  
8 EPA. The RA portion of the RD/RA Work Plan shall include  
9 methodologies, plans, and schedules for completion of, at a  
10 minimum, the following: (1) implementation of the CQAP;  
11 (2) identification of and satisfactory compliance with applicable  
12 permitting requirements; and (3) a schedule for implementing all  
13 Interim Remedial Action tasks identified in the Statement of  
14 Work.

15 17. Unless otherwise approved by EPA, pursuant to the  
16 schedule contained in the attached Statement of Work, Waste  
17 Management shall notify EPA, in writing, of the name, title, and  
18 qualifications of the prime construction contractor proposed to  
19 be used in carrying out work under this Consent Decree. Waste  
20 Management shall obtain an authorization to proceed regarding the  
21 proposed construction contractor from EPA, before the  
22 construction contractor performs any on-site construction work  
23 under this Consent Decree. If, at any time, Waste Management  
24 proposes to change the construction contractor, Waste Management  
25 shall notify EPA and shall obtain an authorization to proceed  
26 from EPA as provided in this paragraph, before the new



1 construction contractor performs any work under this Consent  
2 Decree. If EPA disapproves of the selection of any contractor as  
3 the construction contractor, Waste Management shall submit a list  
4 of contractors that would be acceptable to it to EPA within  
5 thirty (30) days after receipt of EPA's disapproval of the  
6 contractor previously selected.

7 18. The Work performed by each Settlor pursuant to  
8 this Consent Decree shall, at a minimum, achieve the applicable  
9 Performance Standards and other criteria specified in the Interim  
10 Record of Decision including, but not limited to, Section 10.1.3  
11 of the Interim ROD, and as further delineated in the Statement of  
12 Work.

13 19. Notwithstanding any action by EPA in approving  
14 work plans, documents, or other submittals made by the Settlers  
15 under this Decree, and notwithstanding any action taken by EPA  
16 pursuant to Section X (Access and Institutional Controls),  
17 Section XVIII (Emergency Response), and Paragraph 134 of this  
18 Consent Decree, Waste Management remains fully responsible for  
19 achievement of the Performance Standards in the Interim Record of  
20 Decision and as further delineated in the Statement of Work until  
21 the time EPA certifies that the construction of the Interim  
22 Remedial Action is complete in accordance with Paragraph 83.b. of  
23 Section XVII (Certification of Completion). Waste Management  
24 will also be responsible for performing the O&M for the first  
25 three (3) years (or longer period of time to be determined by EPA  
26 and Waste Management in writing pursuant to the criteria



specified in Section 4.6.4 of the SOW attached as Appendix B to this Decree, but in any event not to exceed five (5) years) after EPA certifies construction of the Interim Remedial Action is complete to ensure the Performance Standards in the Interim ROD and as further delineated in the SOW continue to be met between the time EPA issues its Certification of Completion of the Interim Remedial Action and the date Waste Management completes its O&M obligations under this Decree. After Waste Management completes its O&M obligations under this Decree, the Tulalip Tribes will then be responsible for performing the O&M at the Site in such a manner that the Performance Standards in the Interim ROD and as further delineated in the SOW continue to be met, consistent with Section VII (Operation and Maintenance) of this Decree. Nothing in this Consent Decree, or in EPA's approval of the Statement of Work, or in the Remedial Design/Remedial Action Work Plan, or approval of any other submission, shall be deemed to constitute a warranty or representation of any kind by EPA that full performance of the Remedial Design or Interim Remedial Action will achieve the Performance Standards set forth in the Interim ROD and in the Statement of Work. Waste Management's and the Tulalip Tribes' compliance with such approved documents does not foreclose EPA from seeking additional work from either Waste Management or the Tulalip Tribes, as appropriate, to achieve the applicable Performance Standards, provided such additional work is within the scope of the remedy selected in the Interim ROD.



1           20. Waste Management shall, prior to any off-Site  
2 shipment of hazardous substances from the Site to an out-of-state  
3 waste management facility, provide written notification to the  
4 appropriate state environmental official in the receiving state  
5 and to EPA's RPM of such shipment of hazardous substances.  
6 However, the notification of shipments shall not apply to any  
7 off-Site shipments when the total volume of all shipments from  
8 the Site to the state will not exceed ten (10) cubic yards.

9           a. The notification shall be in writing, and shall  
10 include the following information, where available: (1) the name  
11 and location of the facility to which the hazardous substances  
12 are to be shipped; (2) the type and quantity of the hazardous  
13 substances to be shipped; (3) the expected schedule for the  
14 shipment of the hazardous substances; and (4) the method of  
15 transportation. Waste Management shall notify the receiving  
16 state of major changes in the shipment plan, such as a decision  
17 to ship the hazardous substances to another facility within the  
18 same state, or to a facility in another state.

19           b. The identity of the receiving facility and state  
20 will be determined by Waste Management following the award of the  
21 contract for Interim Remedial Action construction. Waste  
22 Management shall provide all relevant information, including  
23 information under the categories noted in Paragraph 20.a. above,  
24 on the off-Site shipments as soon as practicable after the award  
25 of the contract and before the hazardous substances are actually  
26 shipped.



1           21.   Modification of the SOW or Related Work Plans.

2           a.    If EPA determines that modification to the Work  
3 specified in the SOW and/or in Work Plans developed pursuant to  
4 the SOW is necessary to achieve and maintain the Performance  
5 Standards as specified in the Interim ROD and as further  
6 delineated in the SOW, or that modification to the Work specified  
7 in the SOW and/or Work Plans developed pursuant to the SOW is  
8 necessary to carry out and maintain the effectiveness of the  
9 remedy set forth in the Interim ROD, EPA may require that such  
10 modification be incorporated in the SOW and/or such Work Plans.  
11 Provided, however, that a modification may only be required  
12 pursuant to this paragraph to the extent that it is consistent  
13 with the scope of the remedy selected in the Interim ROD.

14           b.    For the purposes of this Consent Decree, the  
15 "scope of the remedy selected in the Interim ROD" is:  
16 installation of an engineered, low permeability cover over the  
17 On-Source Areas of the landfill which will meet the Performance  
18 Standards set out in the Interim ROD and as further delineated in  
19 the SOW. The On-Source Areas to be covered shall include the  
20 waste that is located within the current perimeter of the  
21 approximately 147 acre landfill, and any contaminated soil in the  
22 existing cover material.

23           c.    If a Settlor objects to any modification  
24 determined by EPA to be necessary pursuant to this paragraph, it  
25 may seek dispute resolution pursuant to Section XXII  
26 (Dispute Resolution), Paragraph 114 (record review). The SOW



1 and/or related Work Plans shall be modified in accordance with  
2 final resolution of the dispute.

3 d. A Settlor shall implement any Work required of it  
4 pursuant to any modifications incorporated in the SOW and/or in  
5 Work Plans developed pursuant to the SOW in accordance with this  
6 paragraph and consistent with the provisions of this Consent  
7 Decree.

8 e. Nothing in this paragraph shall be construed to  
9 limit EPA's authority to require performance of further response  
10 actions as provided in this Consent Decree.

#### 11 VII. OPERATION AND MAINTENANCE

12 22. Upon receipt of EPA's written certification of  
13 completion of construction of the remedy selected in the Interim  
14 ROD, Waste Management shall perform O&M as described in the  
15 approved Operation and Maintenance Work Plan contained in the  
16 Pre-Final/Final Design submittal as part of the RD/RA Work Plan  
17 for three (3) years (or longer period of time to be determined by  
18 EPA and Waste Management in writing pursuant to the criteria  
19 specified in Section 4.6.4 of the SOW attached as Appendix B to  
20 this Decree, but in any event not to exceed five (5) years),  
21 commencing on the date EPA issues its Certification of Completion  
22 of the Interim Remedial Action pursuant to Paragraph 93.b. of  
23 this Decree. Waste Management shall be reimbursed all reasonable  
24 and necessary costs consistent with the O&M Work Plan in the  
25 following manner: a) up to \$168,000 per year from the private O&M  
26 trust fund account set up by the Tulalip Tribes and funded by



1 settlement proceeds, with disbursements from such trust fund to  
2 occur upon EPA's written approval, for costs of O&M of the cover  
3 system; and b) if necessary, from \$12,500 up to \$131,250 per  
4 year, depending upon the type of gas collection system installed  
5 and using the cost estimates in Table 4A through Table 4G in the  
6 March 1996 Interim ROD for O&M of the gas collection system.  
7 Nothing in this Consent Decree will require Waste Management to  
8 provide funding for its O&M obligations under this Decree if  
9 funds are unavailable in the private trust account for O&M  
10 activities funded by settlement proceeds and set up by the  
11 Tulalip Tribes or if EPA is unable to provide to Waste Management  
12 \$168,000 per year for O&M of the cover system (and from \$12,500  
13 up to \$131,250 per year, as specified in this Paragraph above,  
14 for O&M of the gas collection system, if necessary). If in any  
15 given year Waste Management does receive \$168,000 for O&M of the  
16 cover system (and from \$12,500 up to \$131,250 per year, as  
17 specified in this Paragraph above, for O&M of the gas collection  
18 system, if necessary), then Waste Management shall be responsible  
19 for all other costs of O&M for that year. After Waste Management  
20 has completed its O&M obligations under this Decree, the Tulalip  
21 Tribes shall perform O&M as described in the approved Operation  
22 and Maintenance Plan contained in the Pre-Final/Final Design  
23 submittal as part of the RD/RA Work Plan.

24           23.a. The Tulalip Tribes shall begin performance of  
25 O&M on the date Waste Management ceases to perform O&M as  
26 specified in Paragraph 22 above, and the Tribes shall continue



1 performing O&M for the next twenty-seven (27) years, or a lesser  
2 period if EPA determines in writing either when EPA approves the  
3 final Remedial Design, or at a later time, that O&M activities  
4 are no longer necessary. Upon receipt of settlement funds from  
5 the SDC Defendants, the Tulalip Tribes shall establish an  
6 interest-bearing private trust account in the form specified at  
7 40 C.F.R. § 264.151(a). The Tulalip Tribes shall deposit all  
8 settlement proceeds it receives from the SDC Defendants pursuant  
9 to the SDC Defendants Consent Decree, anticipated to be  
10 \$3,400,000, into this private trust account. The Tulalip Tribes  
11 shall also deposit \$1,000,000 into this private trust account in  
12 accordance with the payment terms specified in Paragraph 99 of  
13 this Decree. The \$4,400,000 of settlement proceeds placed into  
14 this private trust account, plus all accrued interest, shall be  
15 the initial and preferred source of funds for payment of Waste  
16 Management's and the Tulalip Tribes' reasonable and necessary  
17 costs of O&M activities specified in the O&M Work Plan.

18           b. The agreement establishing the private trust  
19 account specified in Paragraph 23.a., above, shall require the  
20 trustee to disburse funds to Waste Management in accordance with  
21 Paragraphs 24 through 27 of this Consent Decree, and to the  
22 Tulalip Tribes in accordance with the following: upon receipt of  
23 an EPA letter approving the Tulalip Tribes' annual O&M budget,  
24 the trustee shall disburse funds from the private trust fund  
25 account to the Tulalip Tribes on or before January 1st of each  
26 calendar year in an amount equal to the Tulalip Tribes' budget



1 for reasonable and necessary costs of O&M of the cover system  
2 (and gas collection system, if necessary) for that calendar year.  
3 The Tulalip Tribes shall, on or before September 1st of each  
4 calendar year, submit to EPA a detailed budget for reasonable and  
5 necessary O&M activities for the following calendar year. After  
6 government-to-government consultation between EPA and the Tulalip  
7 Tribes, EPA shall approve, approve with modifications, or reject  
8 the Tribes' proposed O&M budget on or before October 1st of each  
9 calendar year. EPA's decision regarding the O&M budget is  
10 subject to the Tulalip Tribes' ability to invoke the dispute  
11 resolution procedures of Section XXII (Dispute Resolution) this  
12 Consent Decree. If a dispute regarding the Tulalip Tribes'  
13 proposed O&M budget cannot be resolved before January 1st of any  
14 given year, then the previous year's O&M budget shall form the  
15 basis of EPA's authorization for disbursement of funds for O&M  
16 until such time as the dispute is resolved and the current O&M  
17 budget is modified, as necessary. If any funds remain  
18 unobligated by the Tulalip Tribes at the end of any given year  
19 for reasonable and necessary O&M activities, then the Tulalip  
20 Tribes' budget for O&M for the following calendar year shall be  
21 reduced by the amount of such unobligated O&M funds from the  
22 previous calendar year's O&M budget. If any funds and/or accrued  
23 interest remain in the private trust account upon completion of  
24 all O&M activities, such funds and accrued interest will be  
25 transferred to the EPA Hazardous Substances Superfund within  
26 thirty (30) days from the date EPA certifies in writing to the



1 Tulalip Tribes that all O&M activities have been completed at the  
2 Site. Should there be an inadequate amount of funds available in  
3 this private trust fund for the Tulalip Tribes' O&M activities,  
4 then two (2) years before such remaining O&M funds are estimated  
5 to be depleted, EPA, BIA, and the Tulalip Tribes agree that they  
6 will consult on a government-to-government basis to determine how  
7 to meet any budget shortfall in a way that does not adversely  
8 affect the integrity of the remedy. After such consultation, if  
9 sufficient funds are not available in the private trust account  
10 for the Tulalip Tribes' continued performance of the required O&M  
11 activities as specified in the O&M Work Plan, then the Tulalip  
12 Tribes' future O&M obligations under this Consent Decree shall be  
13 reimbursed by EPA from EPA's Special Account as set forth in  
14 Paragraph 28 of this Decree. If sufficient funding for a  
15 subsequent full O&M budget year is not available to the Tulalip  
16 Tribes for their continued performance of their O&M obligations  
17 as specified in the O&M Work Plan under this Decree from either  
18 the private trust fund account or from EPA's Special Account,  
19 then all of the Tulalip Tribes' O&M obligations under this Decree  
20 shall be suspended until additional funds from either source are  
21 made available to the Tulalip Tribes by EPA. Nothing in this  
22 Consent Decree will require the Tulalip Tribes to provide funding  
23 for its O&M obligations under this Decree. If sufficient  
24 additional funds for required O&M activities specified in the O&M  
25 Work Plan are not provided to the Tulalip Tribes, then EPA will  
26 assure performance of the remaining necessary O&M activities as



1 specified in the O&M Work Plan. If additional settlement funds  
2 or judgment proceeds become available after EPA has begun  
3 performance of the O&M activities, then EPA and the Tulalip  
4 Tribes will consult on a government-to-government basis to  
5 determine how to proceed with remaining necessary O&M activities  
6 at the Site.

7 A. PAYMENTS FROM THE PRIVATE TRUST FUND ACCOUNT TO WASTE  
8 MANAGEMENT FOR O&M

9 24. Subject to the terms and conditions set forth in  
10 this Consent Decree, the funds in the private trust fund set up  
11 by the Tulalip Tribes pursuant to Paragraph 23 of this Decree and  
12 funded by settlement funds from the Tulalip Tribes and the SDC  
13 Defendants shall be available for disbursement to Waste  
14 Management for performance of O&M under this Consent Decree  
15 pursuant to this Section. EPA shall send a letter to the trustee  
16 requesting that the trustee disburse such funds from the private  
17 trust fund account to Waste Management in the following manner:  
18 After Waste Management completes performance of O&M for a period  
19 of one year after the date Waste Management commences O&M, and  
20 each year thereafter in which Waste Management performs O&M  
21 pursuant to this Consent Decree, Waste Management may request in  
22 writing, sixty (60) days after completing each year of O&M, that  
23 EPA send a letter to the trustee requesting that the trustee  
24 disburse up to \$168,000 per year for O&M of the cover system and  
25 from \$12,500 to \$131,250 per year, as specified in Paragraph 22  
26 above, for O&M of the gas collection system (if necessary) from



1 the private trust fund. In such yearly submission, Waste  
2 Management shall submit to EPA a certification of the complete  
3 and accurate total of the necessary and reasonable costs of O&M  
4 incurred by Waste Management pursuant to this Consent Decree.  
5 Waste Management's certification shall contain the following  
6 statement signed by the chief financial officer of Waste  
7 Management:

8 To the best of my knowledge, after thorough investigation  
9 and review of Waste Management's detailed cost documentation  
10 for performance of Operation and Maintenance taken under  
11 this Consent Decree, I certify that the information  
12 contained in or accompanying this submittal is true,  
accurate, and complete. I am aware that there are  
significant penalties for submitting false information,  
including the possibility of fine and imprisonment for  
knowing violations.

13 25. Waste Management's submittal of the certification  
14 of costs pursuant to Paragraph 24 shall include a copy of the  
15 billing invoice(s) or statement(s) of Waste Management or its O&M  
16 contractor, if any, reflecting the accurate and complete total of  
17 the reasonable and necessary costs of O&M as certified in  
18 Paragraph 24 showing costs incurred for the O&M during the past  
19 year. Waste Management shall submit its certification of costs  
20 and supporting documentation to EPA at the following address:

21 Loren McPhillips  
22 Remedial Project Manager  
23 U.S. Environmental Protection Agency, Region 10  
24 Mail Stop ECL-115  
1200 Sixth Avenue  
Seattle, WA 98101.

25 A copy of the certification and supporting documentation should  
26 also be sent to:



1 Joe Penwell  
2 U.S. Environmental Protection Agency, Region 10  
3 Mail Stop OMP-146  
4 1200 Sixth Avenue  
5 Seattle, WA 98101.

6 Within sixty (60) days of EPA's receipt of Waste Management's  
7 certifications and the supporting documentation required by this  
8 Paragraph, EPA shall request in writing that the trustee disburse  
9 from the private trust fund to Waste Management the certified  
10 total costs of O&M incurred by Waste Management in any given one  
11 year period, up to \$168,000 per year for O&M of the cover system  
12 and from \$12,500 to \$131,250 per year, as specified in Paragraph  
13 22 above, for O&M of the gas collection system (if necessary).  
14 Waste Management shall provide EPA and the trustee with the  
15 information necessary to ensure proper payment from the private  
16 trust fund to Waste Management as provided in this Paragraph.  
17 Such information shall include the name and address of the payee.  
18 Waste Management waives all rights to dispute EPA's or the  
19 trustee's determination of the amount of funds within the private  
20 trust fund.

21 26. Waste Management's submittal of the certification  
22 of costs pursuant to Paragraph 24 above, shall not include costs  
23 incurred by Waste Management for activities taken at or in  
24 relation to the Site by Waste Management for: 1) activities which  
25 are not components of the O&M Work Plan; 2) fees or taxes of any  
26 kind paid by Waste Management or its contractors or  
27 subcontractors to the Tulalip Tribes; 3) Remedial Investigations  
28 or Feasibility Studies; 4) Remedial Design; 5) project



1 management; 6) activities or expenses by Waste Management or its  
2 contractors or subcontractors relating to any de minimis  
3 settlements; 7) legal bills or legal costs associated with Waste  
4 Management's pursuit of other person(s) which might relate in any  
5 way to the Site; 8) any costs Waste Management incurs pursuant to  
6 the AOC for RI/FS to which Waste Management is a signatory; and  
7 9) any costs Waste Management incurs pursuant to Sections X (for  
8 costs associated with implementation of institutional controls or  
9 attorneys fees and legal costs associated with access or  
10 institutional controls), XVIII, or Paragraphs 129, 130, and 134  
11 of Section XXIV of this Decree.

12           27. Disbursement of funds under Paragraph 25 of this  
13 Consent Decree will terminate without reservation (i) upon EPA's  
14 assumption of performance of any portion of the O&M that Waste  
15 Management had agreed to perform where such assumption of Work is  
16 not challenged by Waste Management or, if challenged, is upheld  
17 in the Dispute Resolution procedures of this Consent Decree; or  
18 (ii) where EPA has issued a Stop Work Order and EPA has taken  
19 over O&M activities pursuant to Paragraph 134 of this Decree; or  
20 (iii) upon EPA's determination that Waste Management submitted a  
21 false, inaccurate, incomplete, or misleading certification or  
22 documentation, or that Waste Management failed to submit the  
23 certification or documentation, as required pursuant to  
24 Paragraph 24 of this Consent Decree.



1        B.    PAYMENTS FROM EPA'S SPECIAL ACCOUNT FOR O&M TO THE  
2            TULALIP TRIBES

3            28.   If settlement proceeds are unavailable for  
4 placement into the Tulalip Tribes' private trust account  
5 referenced in Paragraph 23 above, and subject to the terms and  
6 conditions set forth in this Consent Decree, EPA agrees to make  
7 available the funds in the Tulalip Landfill Special Account for  
8 disbursement to the Tulalip Tribes for performance of O&M under  
9 this Consent Decree pursuant to this Section after the O&M  
10 obligations of Waste Management under this Decree have been  
11 completed by Waste Management.   EPA shall disburse such funds  
12 from the Tulalip Landfill Special Account to the Tulalip Tribes  
13 in the following manner: After the Tulalip Tribes complete  
14 performance of O&M for a period of three (3) months after the  
15 date the Tulalip Tribes commences O&M, and each three (3) month  
16 period thereafter in which the Tulalip Tribes performs O&M  
17 pursuant to this Consent Decree, the Tulalip Tribes may request,  
18 ten (10) days after completing each three-month period of O&M,  
19 that EPA disburse up to the amount of necessary and reasonable  
20 costs of performing O&M activities specified in the O&M Work  
21 Plan, from the EPA Tulalip Landfill Special Account.   In every  
22 three month submission, the Tulalip Tribes shall submit to EPA a  
23 certification of the complete and accurate total of the necessary  
24 and reasonable costs of O&M incurred by the Tulalip Tribes  
25 pursuant to this Consent Decree.   The Tulalip Tribes'



1 certification shall contain the following statement signed by a  
2 responsible tribal officer of the Tulalip Tribes:

3 To the best of my knowledge, after thorough investigation  
4 and review of the Tulalip Tribes's detailed cost  
5 documentation for performance of Operation and Maintenance  
6 taken under this Consent Decree, I certify that the  
7 information contained in or accompanying this submittal is  
8 true, accurate, and complete. I am aware that there are  
9 significant penalties for submitting false information,  
10 including the possibility of fine and imprisonment for  
11 knowing violations.

12 29. The Tulalip Tribes' submittal of the certification  
13 of costs pursuant to Paragraph 28 shall include a copy of the  
14 billing invoice(s) or statement(s) of the Tulalip Tribes' O&M  
15 contractor reflecting the accurate and complete total of the  
16 reasonable and necessary costs of O&M as certified in  
17 Paragraph 28 showing costs incurred for the O&M during the past  
18 three months. At the end of each calendar year, the Tulalip  
19 Tribes shall submit a projected O&M budget for the following  
20 year. This budget shall form the basis for the disbursements for  
21 that year. The Tulalip Tribes shall submit its certification of  
22 costs, yearly budget, and supporting documentation to EPA at the  
23 following address:

24 Loren McPhillips  
25 Remedial Project Manager  
26 U.S. Environmental Protection Agency, Region 10  
27 Mail Stop ECL-115  
28 1200 Sixth Avenue  
Seattle, WA 98101.

29 A copy of the certification, budget, and supporting documentation  
30 should also be sent to:



1 Joe Penwell  
2 U.S. Environmental Protection Agency, Region 10  
3 Mail Stop OMP-146  
4 1200 Sixth Avenue  
5 Seattle, WA 98101.

6 Within sixty (60) days of EPA's receipt of the Tulalip Tribes'  
7 certifications, budget, and the supporting documentation required  
8 by this Paragraph, EPA shall disburse from the EPA Tulalip  
9 Landfill Special Account to the Tulalip Tribes the reasonable and  
10 necessary costs of performing O&M for that preceding calendar  
11 quarter. The Tulalip Tribes shall provide EPA with the  
12 information necessary to ensure proper payment from EPA's Tulalip  
13 Landfill Special Account to the Tulalip Tribes as provided in  
14 this Paragraph. Such information shall include the name and  
15 address of the payee. The Tulalip Tribes waive all rights to  
16 dispute EPA's determination of the amount of funds within the EPA  
17 Tulalip Landfill Special Account.

18 30. The Tulalip Tribes' submittal of the certification  
19 of costs pursuant to Paragraph 28 above, shall not include costs  
20 incurred by the Tulalip Tribes for activities taken at or in  
21 relation to the Site by the Tulalip Tribes for: 1) activities  
22 which are not components of the O&M Work Plan; 2) Remedial  
23 Investigations or Feasibility Studies; 3) activities or expenses  
24 by the Tulalip Tribes or its contractors or subcontractors  
25 relating to any de minimis settlements; 4) legal bills or legal  
26 costs associated with the Tulalip Tribes' pursuit of other  
27 person(s) which might relate in any way to the Site; and 5) any  
28 costs the Tulalip Tribes incur pursuant to Section X (for costs



1 associated with implementation of institutional controls or  
2 attorneys fees and legal costs associated with access or  
3 institutional controls), Section XVIII, or Paragraphs 129, 130,  
4 and 134 of Section XXIV of this Decree.

5           31. The United States' obligation to disburse funds  
6 under Paragraph 29 of this Consent Decree will terminate without  
7 reservation with respect to all subsequent O&M costs of the  
8 Tulalip Tribes (i) upon EPA's assumption of performance of any  
9 portion of the O&M that the Tulalip Tribes had agreed to perform  
10 where such assumption of Work is not challenged by the Tulalip  
11 Tribes or, if challenged, is upheld in the Dispute Resolution  
12 procedures of this Consent Decree; or (ii) where EPA has issued a  
13 Stop Work Order and EPA has taken over O&M activities pursuant to  
14 Paragraph 134 of this Decree; (iii) upon EPA's determination that  
15 the Tulalip Tribes submitted a false, inaccurate, incomplete, or  
16 misleading certification or documentation, or that the Tulalip  
17 Tribes failed to submit the certification or documentation, as  
18 required pursuant to Paragraph 28 of this Consent Decree; or (iv)  
19 upon EPA's obligation to assume performance of the necessary O&M  
20 activities pursuant to Paragraph 23 of this Consent Decree.

21           32. After completion of all disbursements required  
22 pursuant to Paragraphs 25 or 29 of this Consent Decree, if any  
23 funds remain in the EPA Tulalip Landfill Special Account, EPA may  
24 cause all or any portion of such funds to revert to the EPA  
25 Hazardous Substance Superfund. Such reversion of funds to the  
26 EPA Hazardous Substance Superfund shall not be subject to



challenge by any Settlor pursuant to the dispute resolution procedures set forth in Section XXII (Dispute Resolution) of this Consent Decree or before any tribunal.

#### VIII. REMEDY REVIEW

33. Periodic Review. EPA will conduct reviews of whether the Interim Remedial Action is protective of human health and the environment at least every five (5) years as required by Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and any applicable regulations.

34. EPA Selection of Further Response Actions. If EPA determines, at any time, that the Interim Remedial Action is not protective of human health and the environment, EPA may select further response actions for the Site in accordance with the requirements of CERCLA and the NCP. Such further response actions for the On-Source Areas of the Site shall be performed and funded in accordance with Paragraph 36 of this Consent Decree. Except as otherwise provided in Paragraph 37 for Waste Management or except as otherwise provided in Paragraphs 36 and 38 for the Tulalip Tribes, neither Waste Management nor the Tulalip Tribes, nor their Related Entities, shall be responsible for funding further response actions for the On-Source Areas of the Site. The SDC Defendants and their Related Entities shall not be responsible for funding further response actions for the On-Source Areas of the Site.

35. Opportunity To Comment. Waste Management and the Tulalip Tribes and, if required by Sections 113(k)(2) or 117 of



1 CERCLA, 42 U.S.C. §§ 9613(k)(2) or 9617, the public, will be  
2 provided with an opportunity to comment on any further response  
3 actions proposed by EPA as a result of the review conducted  
4 pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and to  
5 submit written comments for the record during the comment period.

6           36. Obligation To Perform or Fund Further Response  
7 Actions. If EPA selects such further response actions to address  
8 failure of the selected Interim Remedial Action for the On-Source  
9 Areas of the Site, such further response actions shall be funded  
10 as follows:

11           a. The first \$250,000 of response costs incurred  
12 shall be the responsibility of The Tulalip Tribes. The Tulalip  
13 Tribes shall, within thirty (30) days from the date of entry of  
14 this Consent Decree, establish an irrevocable standby letter of  
15 credit for the first \$250,000 of further response costs  
16 associated with the failure of the selected Interim Remedial  
17 Action. The Tulalip Tribes shall notify EPA in writing of the  
18 name of the financial institution the Tribes have chosen to  
19 establish the letter of credit, and the Tribes shall notify EPA  
20 in writing within thirty (30) days of any change by the Tribe to  
21 a new financial institution issuing this letter of credit. This  
22 letter of credit must be in the form specified at 40 C.F.R.  
23 § 264.151(d), and must remain available for a period of thirty  
24 (30) years, unless EPA in writing notifies the Tulalip Tribes  
25 otherwise.



1           b.    The next \$3,000,000 of response costs incurred  
2 shall be the responsibility of EPA.

3           c.    The next \$1,750,000 of response costs incurred  
4 shall be the responsibility of the Monsanto Company, University  
5 of Washington, Lockheed Ship Building, Port of Seattle, Sears &  
6 Roebuck, Quemetco, Inc., and the City of Mercer Island,  
7 Washington.

8           d.    Any further response costs incurred above  
9 \$5,000,000 shall be the responsibility of the Settling Federal  
10 Agencies.

11           e.    The EPA Region 10 Regional Administrator shall  
12 notify the Tulalip Tribes and the financial institution the  
13 Tribes have chosen to establish the irrevocable standby letter of  
14 credit in writing if and when the Tribes' obligation to pay has  
15 become due and payable. Within thirty (30) days of receipt of  
16 EPA's written notice, the Tribes' selected financial institution  
17 shall send all or a portion (as specified by EPA in its written  
18 notice) of the \$250,000 payment required of the Tulalip Tribes by  
19 this Paragraph, to the United States in accordance with the  
20 payment procedures specified in Paragraph 100 of this Consent  
21 Decree. The Tulalip Tribes shall be responsible for payment of  
22 Interest on any overdue payments required by this Paragraph in  
23 accordance with Paragraph 101 of this Consent Decree. Any  
24 failure to make payments under this Paragraph shall be a  
25 violation of this Consent Decree.



1 f. "Failure of the selected Interim Remedial Action"  
2 as that term is used in Paragraph 36 herein shall mean that EPA  
3 has made a written determination that the cover system  
4 constructed by Waste Management and the O&M performed by Waste  
5 Management and/or the Tulalip Tribes has not effectively provided  
6 long-term minimization of migration of liquids through the  
7 landfill such that further response action is necessary in order  
8 to protect human health or the environment. The necessity for  
9 further response action shall be determined by EPA after the  
10 performance of a written, streamlined risk assessment consistent  
11 with EPA's policies and procedures on presumptive remedies for  
12 CERCLA municipal landfill sites. It may rely upon information  
13 already contained in the August 1995 Tulalip Landfill Risk  
14 Assessment for Interim Remedial Action, including the  
15 contaminants of concern, the relevant receptors and media,  
16 toxicity evaluations, and other relevant information. The  
17 assessment will incorporate monitoring data collected during  
18 operation and maintenance of the cap as specified in the Interim  
19 ROD and any post-construction care documents approved by EPA. If  
20 leachate seeps of concern continue after the cover system has  
21 been certified complete and the cover system was constructed in  
22 accordance with the Performance Standards in the Interim ROD and  
23 as further delineated in the SOW, EPA will consider the following  
24 factors in order to determine whether further response actions  
25 are necessary:  
26



- (1) the number and magnitude of exceedances over relevant standards for each contaminant of concern over time;
- (2) the number of contaminants in exceedance of environmental standards and criteria;
- (3) the number of and/or flow rates of leachate seeps over time; and
- (4) the costs and benefits of additional remedial action.

37. Waste Management, and not the Tulalip Tribes, EPA, nor the United States, shall be responsible for costs of further response actions under Paragraph 36 of this Decree to the extent that the Tribes, EPA, and the United States can establish, at any time within three (3) years (or longer period of time to be determined by EPA and Waste Management in writing pursuant to the criteria specified in Section 4.6.4 or the SOW attached as Appendix B to this Decree, but in any event not to exceed five (5) years) from the date Waste Management received EPA's written certification of completion of the cover system, that such further response costs are incurred as a result of a failure by Waste Management to:

- a. perform the Work as specified in this Decree, including the SOW developed hereto, and as specified in the Interim ROD; or,



1           b.    comply with work plans and other  
2                   plans, standards, and  
3                   specifications set forth in this  
4                   Decree, including Performance  
5                   Standards identified in the Interim  
6                   ROD and as further delineated in  
7                   the SOW, the O&M Plan, and the  
8                   Construction Quality Assurance  
9                   Plan.

10 The Parties agree that Waste Management will not be liable for  
11 further response actions for failure to properly construct the  
12 cover system or for failure to comply with work plans, standards  
13 and specifications at any time after three (3) years (or longer  
14 period of time to be determined by EPA and Waste Management in  
15 writing pursuant to the criteria specified in Section 4.6.4 of  
16 the SOW attached as Appendix B to this Decree, but in any event  
17 not to exceed five (5) years) from the date EPA certified that  
18 construction of the cover system has been completed.

19           38. The Tulalip Tribes, and not Waste Management, EPA,  
20 nor the United States, shall be responsible for costs of further  
21 response actions under Paragraph 36 of this Decree to the extent  
22 that Waste Management, EPA, and the United States can establish,  
23 at any time, that such further response costs are incurred as a  
24 result of a failure by the Tulalip Tribes to comply with the  
25 Operations and Maintenance Plan and/or the land use plan  
26 according to the Interim ROD entitled "Routine Use of Tulalip



1 ('Big Flats') Landfill" document developed pursuant to  
2 Paragraph 48 of Section X (Access and Institutional Controls) of  
3 this Decree; provided, however, that the Tulalip Tribes shall not  
4 be responsible for costs of further response actions under  
5 Paragraph 36 of this Decree if the failure to perform O&M or the  
6 failure to comply with the Operation and Maintenance Plan under  
7 this Decree results from a lack of funding under Section VII  
8 (Operation and Maintenance) of this Decree.

9           39. Except as specified in Paragraph 37 of this  
10 Decree, Waste Management or its Related Entities shall have no  
11 obligation to perform or fund further response actions to address  
12 failure of the selected Interim Remedial Action as specified in  
13 Paragraph 36 of this Decree. In addition, Waste Management and  
14 its Related Entities shall have no obligation to perform or fund  
15 further response actions to address releases or threatened  
16 releases of hazardous substances from the Off-Source Areas of the  
17 Site.

18           IX. QUALITY ASSURANCE, SAMPLING, and DATA ANALYSIS

19           40. Each Settlor shall use quality assurance, quality  
20 control, and chain-of-custody procedures for all treatability,  
21 design, compliance, and monitoring samples in accordance with  
22 "EPA Requirements for Quality Assurance Project Plans for  
23 Environmental Data Operation" (EPA QA/R5); "Preparing Perfect  
24 Project Plans" (EPA/600/9-88/087), and subsequent amendments to  
25 such guidelines upon notification by EPA to each Settlor of such  
26 amendment. Amended guidelines shall apply only to procedures



1 conducted after such notification. Prior to the commencement of  
2 any monitoring project under this Consent Decree, each Settlor,  
3 as appropriate, shall submit to EPA for approval, a Quality  
4 Assurance Project Plan ("QAPP") that is consistent with the SOW,  
5 the NCP, and applicable guidance documents. If relevant to the  
6 proceeding, the Parties agree that validated sampling data  
7 generated in accordance with the QAPP(s) and reviewed and  
8 approved by EPA shall be admissible as evidence, without  
9 objection, in any proceeding under this Decree. Each Settlor, as  
10 appropriate, shall ensure that EPA personnel and their authorized  
11 representatives are allowed access at reasonable times to all  
12 laboratories utilized by that Settlor in implementing this  
13 Consent Decree. In addition, each Settlor shall ensure that such  
14 laboratories shall analyze all samples submitted by EPA pursuant  
15 to the QAPP for quality assurance monitoring. Each Settlor shall  
16 ensure that the laboratories it utilizes for the analysis of  
17 samples taken pursuant to this Decree perform all analyses  
18 according to accepted EPA methods. As necessary, each Settlor  
19 shall use accepted EPA methods which are documented in the  
20 "Contract Lab Program Statement of Work for Inorganic Analysis"  
21 and the "Contract Lab Program Statement of Work for Organic  
22 Analysis", dated February 1988, and any amendments made thereto  
23 during the course of the implementation of this Consent Decree.  
24 Each Settlor shall ensure that all laboratories it uses for  
25 analysis of samples taken pursuant to this Consent Decree  
26 participate in an EPA or EPA-equivalent QA/QC program. Each



Settlor shall ensure that all field methodologies utilized by it in collecting samples for subsequent analysis pursuant to this Consent Decree will be conducted in accordance with the procedures set forth in the QAPP approved by EPA.

41. Upon request, each Settlor shall allow split or duplicate samples to be taken by EPA or its authorized representatives. Each Settlor shall notify EPA not less than fourteen (14) days in advance of any sample collection activity by it unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow a Settlor to take split or duplicate samples of any samples it takes as part of EPA's oversight of that Settlor's implementation of the Work.

42. Each Settlor shall submit to EPA copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of that Settlor with respect to the Site (as specified in the SOW and associated Work Plans) and/or the implementation of this Consent Decree unless EPA agrees otherwise.

43. Notwithstanding any provision of this Consent Decree, the United States hereby retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.



1 X. ACCESS AND INSTITUTIONAL CONTROLS

2 44. Commencing upon the date of lodging of this  
3 Consent Decree, Waste Management and the Tulalip Tribes and BIA,  
4 as appropriate, agree to provide the United States and their  
5 representatives, including EPA and its contractors, access at all  
6 reasonable times to the Site and any other property to which  
7 access is required for the implementation of this Consent Decree,  
8 to the extent access to the property is controlled by Waste  
9 Management, BIA, or the Tulalip Tribes, for the purposes of  
10 conducting any activity related to this Consent Decree,  
11 including, but not limited to:

- 12 a. Monitoring the Work;
- 13 b. Verifying any data or information submitted to the  
14 United States;
- 15 c. Conducting investigations relating to  
16 contamination at or near the Site;
- 17 d. Obtaining samples;
- 18 e. Assessing the need for, planning, or implementing  
19 additional response actions at or near the Site;
- 20 f. Inspecting and copying records, operating logs,  
21 contracts, or other documents maintained or  
22 generated by Waste Management or the Tulalip  
23 Tribes or their agents, consistent with Section  
24 XXVII; and
- 25 g. Assessing Waste Management's and the Tulalip  
26 Tribes' compliance with this Consent Decree.

27 45. To the extent that the Site or any other property  
28 to which access is required for the implementation of this  
Consent Decree is owned or controlled by a person other than  
Waste Management or the Tulalip Tribes, Waste Management or the



1 Tulalip Tribes, as appropriate, shall use its best efforts to  
2 secure from such person access for Waste Management or the  
3 Tulalip Tribes, as well as for the United States and their  
4 representatives, including, but not limited to, their  
5 contractors, as necessary for that Settlor to effectuate this  
6 Consent Decree. For purposes of this paragraph "best efforts"  
7 includes the payment of reasonable sums of money in consideration  
8 of access not to exceed the fair market value of the access  
9 rights taken. No payments for access shall be required to be  
10 made to a person who owns such property who is also a potentially  
11 responsible party at the Tulalip Landfill Site. If any access  
12 required to complete the Work is not obtained within forty-five  
13 (45) days of the date of lodging of this Consent Decree, or  
14 within forty-five (45) days of the date EPA notifies a Settlor,  
15 in writing, that additional access beyond that previously secured  
16 is necessary, that Settlor shall promptly notify the United  
17 States, in writing, and shall include in that notification a  
18 summary of the steps that Settlor has taken to attempt to obtain  
19 access. The United States may, as it deems appropriate, assist  
20 that Settlor in obtaining access.

21 46.a. The Tulalip Tribes and the BIA, to the extent  
22 that BIA has the authority to do so, hereby grant Waste  
23 Management and its authorized representatives the right to enter  
24 upon the respective portions of the Site that are located on  
25 lands held in trust by the United States for the benefit of the  
26 Tulalip Tribes of Washington or the Tulalip Section 17



1 Corporation. Such right shall be deemed a non-exclusive license  
2 to Waste Management and shall be limited to all access necessary  
3 to perform activities required under this Consent Decree and  
4 shall not be revocable for the duration of Waste Management's  
5 activities required under this Decree.

6           b. The Tulalip Tribes hereby grant Waste Management  
7 and its authorized representatives a non-exclusive license of  
8 such rights as the Tulalip Tribes possesses for ingress and  
9 egress to the Site across adjacent property as derived from the  
10 following documents: (1) Right of Entry agreement between the  
11 State of Washington and the Tulalip Section 17 Corporation dated  
12 September 1, 1970; (2) Stipulated and Agreed Order Adjudicating  
13 Private Use of Necessity entered by the Snohomish County Superior  
14 Court, in Cause No. 108571, dated November 30, 1971; (3) Private  
15 Roadway and Crossing Agreement between Burlington Northern Inc.  
16 and the Tulalip Tribes dated August 16, 1971; (4) the Agreement  
17 between Edwin W. Hayes and the Tulalip Tribes of Washington dated  
18 November 4, 1971; and (5) any other documents granting the  
19 Tulalip Tribes or the Tulalip Section 17 Corporation access to  
20 the Site across adjacent property; collectively "the Access  
21 Documents." The Tulalip Tribes make no representation or  
22 warranty regarding the adequacy or effect of the access granted  
23 herein as sufficient for performing the activities required under  
24 this Decree. Such rights given to Waste Management under this  
25 subparagraph shall be limited to all access necessary to perform  
26 activities required under this Consent Decree and shall not be



1 revocable for the duration of Waste Management's activities  
2 required under this Decree.

3 c. Waste Management shall comply with any and all  
4 terms and conditions of the Access Documents unless otherwise  
5 directed by EPA and shall take reasonable care during performance  
6 of the work required under this Decree to avoid unnecessary  
7 impairment of rights of access to the Site of the Tulalip Tribes.

8 d. Nothing herein shall limit the right or ability of  
9 Waste Management to obtain from adjacent property owners separate  
10 rights of access supplemental to or in lieu of rights granted  
11 herein by the Tulalip Tribes. The Tulalip Tribes agree to  
12 provide assistance to Waste Management in obtaining additional  
13 access to the Site or to adjoining properties that is necessary  
14 to carry out any of the activities of Waste Management pursuant  
15 to this Decree, including but not limited to making written  
16 request for necessary consents or approval required under the  
17 Access Documents. Waste Management agrees that the obligation to  
18 provide such assistance does not obligate the Tulalip Tribes to  
19 provide compensation, incur liability or undertake litigation to  
20 acquire additional access on behalf of Waste Management. Waste  
21 Management retains the right to recover compensation from the  
22 Tulalip Tribes for any additional access rights that are  
23 requested by and conveyed to the Tulalip Tribes.

24 e. The Tulalip Tribes shall be provided a reasonable  
25 opportunity to review any proposed access improvements to be  
26 installed by Waste Management that are required under the Access



1 Documents. Roadway improvements necessary for access will be  
2 constructed at Waste Management's expense. The Tulalip Tribes  
3 agree that they shall be responsible for all costs of additional  
4 improvements requested by the Tulalip Tribes to the extent such  
5 additional improvements are beyond what would otherwise be  
6 required under the Access Documents or this Consent Decree.

7 f. The Tulalip Tribes and the BIA expressly reserve  
8 full rights of access to the Site as such rights currently exist,  
9 provided, however, that the Tulalip Tribes and the BIA shall not,  
10 in the exercise of their property rights or rights of access to  
11 the Site interfere with or impede Waste Management's access to  
12 the Site or adjacent property or activities in performance of the  
13 Work required under this Decree, except as required by 1)  
14 applicable federal statute, regulation or permit, 2) EPA  
15 directive or order, or 3) court order. The Tulalip Tribes and  
16 the BIA shall comply with all approved Work Plans as those plans  
17 pertain to Site access including, but not limited to, the Health  
18 and Safety Plan. Any subsequent grants of access to the Site or  
19 under the Access Documents by the Tulalip Tribes or the BIA or  
20 other conveyance of property rights affecting access to the Site  
21 to third parties shall be expressly subject to and subordinate to  
22 access rights granted to Waste Management herein for the duration  
23 of this Decree.

24 g. For purposes of Waste Management's indemnification  
25 rights against the Tulalip Tribes pursuant to Paragraph 103(b) of  
26 Section XX herein, the Tulalip Tribes and EPA agree as follows;



1 however, nothing in this subparagraph prevents Waste Management  
2 from asserting that any action may qualify as a Force Majeure  
3 event pursuant to Section XXI (Force Majeure) of this Decree:

4           (1) With respect to the Tulalip Tribes'  
5 obligation to grant access pursuant to subparagraphs  
6 46.a. and 46.b. herein, the Tulalip Tribes and EPA  
7 agree that any inability of Waste Management to use  
8 such access for performance of the Work that arises due  
9 to circumstances beyond the control of the Tulalip  
10 Tribes shall constitute a Force Majeure event. If the  
11 inability of Waste Management to use such access arises  
12 from the Tulalip Tribes' negligent or wrongful action,  
13 the Tulalip Tribes agree that the limited waiver of  
14 sovereign immunity set forth in Paragraph 1.c. of  
15 Section II (Jurisdiction) of this Decree shall, subject  
16 to the limitations therein, apply to any claim of  
17 damages which Waste Management can establish occurred  
18 as a direct result of such negligent or wrongful  
19 action.

20           (2) With respect to the Tulalip Tribes'  
21 obligation to assist in obtaining additional access  
22 pursuant to subparagraph 46.d. of this Decree, the  
23 Tulalip Tribes and EPA agree that any failure by the  
24 Tulalip Tribes to assist in obtaining such additional  
25 access required by Waste Management for performance of  
26 the Work that arises due to circumstances beyond the



1 control of the Tulalip Tribes shall constitute a Force  
2 Majeure event. If the failure to assist in obtaining  
3 such additional access arises from the Tulalip Tribes'  
4 negligent or wrongful action, the Tulalip Tribes agree  
5 that the limited waiver of sovereign immunity set forth  
6 in Paragraph 1.c. of Section II (Jurisdiction) herein  
7 shall, subject to the limitations therein, apply to any  
8 claim of damages which Waste Management can establish  
9 occurred as a direct result of such negligent or  
10 wrongful action.

11 (3) With respect to the Tulalip Tribes'  
12 obligation not to interfere with or impede Waste  
13 Management's access to the Site or adjacent property or  
14 Waste Management's activities in performance of the  
15 Work pursuant to subparagraph 46.f. of this Decree, the  
16 Tulalip Tribes and EPA agree that any delay resulting  
17 from the Tulalip Tribes' breach of this obligation due  
18 to circumstances beyond the control of the Tulalip  
19 Tribes shall constitute a Force Majeure event. If the  
20 breach of this obligation is due to the Tulalip Tribes'  
21 negligent or wrongful action, the Tulalip Tribes agree  
22 that the limited waiver of sovereign immunity set forth  
23 in Paragraph 1.c. of Section II (Jurisdiction) herein  
24 shall, subject to the limitations therein, apply to any  
25 claim of damages which Waste Management can establish  
26



1 occurred as a direct result of such negligent or  
2 wrongful action.

3 (4) With respect to Waste Management's obligations  
4 under Section XVIII (Emergency Response) of this  
5 Decree, the Tulalip Tribes and EPA agree that any delay  
6 in the implementation of the Work resulting from an  
7 emergency situation under Section XVIII due to  
8 circumstances beyond the control of the Settling  
9 Parties shall constitute a Force Majeure event. If the  
10 emergency situation under Section XVIII is the direct  
11 result of the Tulalip Tribes' negligent or wrongful  
12 action, the Tulalip Tribes agree that the limited  
13 waiver of sovereign immunity set forth in Paragraph  
14 1.c. of Section II (Jurisdiction) herein shall, subject  
15 to the limitations therein, apply to any claim of  
16 damages which Waste Management can establish occurred  
17 as a direct result of such negligent or wrongful  
18 action.

19 47. Notwithstanding any provision of this Consent  
20 Decree, the United States retains all of its access authorities  
21 and rights, including enforcement authorities related thereto,  
22 under CERCLA, RCRA, and any other applicable statute or  
23 regulations.

24 48. When design and construction of the Interim  
25 Remedial Action selected in the Interim ROD are complete, EPA and  
26 the Tulalip Tribes shall develop and approve a land use plan



1 according to the Interim ROD entitled "Routine Use of Tulalip  
2 ('Big Flats') Landfill," the purpose of which shall be to  
3 identify future uses of the Site that are compatible with the  
4 continued integrity of the cover system and protective of the  
5 Off-Source Areas of the Site. Waste Management will be provided  
6 an opportunity to comment on the draft final version of this  
7 document. This document shall not impair either Waste  
8 Management's or the Tulalip Tribes' abilities to properly perform  
9 O&M in accordance with the O&M Work Plan developed pursuant to  
10 this Decree. This document shall be finalized and approved by  
11 EPA and the Tulalip Tribes no later than 365 days from the date  
12 EPA issues its Certification of Completion of Interim Remedial  
13 Action to Waste Management pursuant to Paragraph 93.b. of this  
14 Decree. The "Routine Use of Tulalip ('Big Flats') Landfill"  
15 document shall, at a minimum, delineate routine Site uses that  
16 may occur on the surface of the landfill cover and uses that  
17 shall not occur, in accordance with the land use restrictions  
18 established in the Interim ROD. Any land use and ground water  
19 use restrictions will be imposed on all necessary portions of  
20 property that comprises the Site as covenants running with the  
21 land for the purpose of protecting human health and the  
22 environment by protecting in perpetuity the Interim Remedial  
23 Action and other response actions taken at the Site under this  
24 Decree. The land use and ground water use restrictions shall be  
25 created by the Tulalip Tribes as covenants running with the land  
26 no later than 120 days from the date the "Routine Use of Tulalip



1 ('Big Flats') Landfill" document has been finalized by EPA and  
2 the Tulalip Tribes. Such restrictions may include, but will not  
3 necessarily be limited to, items such as preserving existing  
4 access roadways to the landfill, maintenance of an "environmental  
5 buffer zone" which will be created on the surface of the landfill  
6 cover, and signage at the Site which summarizes the activities  
7 which may occur on the landfill cover as well as restrictions on  
8 use of the landfill cover and the location of the "environmental  
9 buffer zone."

#### 10 XI. REPORTING REQUIREMENTS

11 49. In addition to any other requirement of this  
12 Consent Decree, Waste Management shall submit to EPA the number  
13 of copies of written monthly progress reports as specified in the  
14 SOW and associated Work Plans that: (a) describe the actions  
15 which have been taken toward achieving compliance with this  
16 Consent Decree during the previous month; (b) include a summary  
17 of all results of sampling and tests and all other data received  
18 or generated by Waste Management or its contractors or agents in  
19 the previous month; (c) identify all Work Plans, plans, and other  
20 deliverables required by this Consent Decree completed and  
21 submitted during the previous month; (d) describe all actions,  
22 including, but not limited to, data collection and implementation  
23 of Work Plans, which are scheduled for the next sixty (60) days  
24 and provide other information relating to the progress of  
25 construction, including, but not limited to, critical path  
26 diagrams, Gantt charts, and/or Pert charts; (e) include



1 information regarding percentage of completion, unresolved  
2 delays, encountered or anticipated, that may affect the future  
3 schedule for implementation of the Work, and a description of  
4 efforts made to mitigate those delays or anticipated delays; (f)  
5 include any modifications to the Work Plans or other schedules  
6 that Waste Management has proposed to EPA or that have been  
7 approved by EPA; and (g) describe all activities undertaken in  
8 support of the Community Relations Plan during the previous month  
9 and those to be undertaken in the next sixty (60) days. Waste  
10 Management shall submit these progress reports to EPA by the  
11 tenth day of every month following the lodging of this Consent  
12 Decree until EPA notifies the Waste Management pursuant to  
13 Paragraph 93.b. of Section XVII (Certification of Completion).  
14 If requested by EPA, Waste Management shall also provide  
15 briefings for EPA to discuss the progress of the Work.

16           50. Waste Management shall notify EPA of any change in  
17 the schedule described in the monthly progress report for the  
18 performance of any activity, including, but not limited to, data  
19 collection and implementation of Work Plans, no later than seven  
20 (7) days prior to the performance of the activity.

21           51. Upon the occurrence of any event during  
22 performance of the Work that Waste Management is required to  
23 report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or  
24 Section 304 of the Emergency Planning and Community Right-to-Know  
25 Act (EPCRA), 42 U.S.C. § 11004, Waste Management shall, within  
26 twenty-four (24) hours of the onset of such event, orally notify



1 the EPA Project Coordinator or the Alternate EPA Project  
2 Coordinator (in the event of the unavailability of the EPA  
3 Project Coordinator), or, in the event that neither the EPA  
4 Project Coordinator or Alternate EPA Project Coordinator is  
5 available, the Emergency Response and Site Cleanup Unit, Region  
6 10, United States Environmental Protection Agency. These  
7 reporting requirements are in addition to the reporting required  
8 by CERCLA Section 103 or EPCRA Section 304.

9 52. Within twenty (20) days of the onset of such an  
10 event, Waste Management shall furnish to Plaintiff a written  
11 report, signed by Waste Management's Project Manager, setting  
12 forth the events which occurred and the measures taken, and to be  
13 taken, in response thereto. Within thirty (30) days of the  
14 conclusion of such an event, Waste Management shall submit a  
15 report setting forth all actions taken in response thereto.

16 53. Waste Management shall submit copies of all plans,  
17 reports, and data required by and in accordance with the SOW, the  
18 Remedial Design/Remedial Action Work Plan, the O&M Work Plan, or  
19 any other approved plans to EPA in accordance with the schedules  
20 set forth in such plans.

21 54. Unless otherwise specified by EPA; commencing on  
22 the date which is three (3) years (or longer period of time to be  
23 determined by EPA and Waste Management in writing pursuant to the  
24 criteria specified in Section 4.6.4 of the SOW attached as  
25 Appendix B to this Decree, but in any event not to exceed five  
26 (5) years) after EPA's issuance of its Certification of



1 Completion of the Interim Remedial Action as specified in Section  
2 XVII of this Decree, the Tulalip Tribes shall submit quarterly  
3 progress reports documenting activities the Tulalip Tribes have  
4 taken in the past three months, and anticipated actions it will  
5 take in the next three months, regarding its performance of the  
6 O&M in compliance with the O&M Work Plan. If the Tulalip Tribes  
7 conduct O&M activities using settlement funds from the Tribes'  
8 private trust account pursuant to Paragraph 23 of this Decree,  
9 then the Tribes shall submit semi-annual progress reports under  
10 this Paragraph.

11 55. All reports and other documents submitted by a  
12 Settlor to EPA (other than the monthly progress reports required  
13 of Waste Management) which purport to document a Settlor's  
14 compliance with the terms of this Consent Decree shall be signed  
15 by an authorized representative of the submitting Settlor.

16 XII. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

17 56. After review of any plan, report, or other item  
18 which is required to be submitted for approval pursuant to this  
19 Consent Decree, EPA, after reasonable opportunity for review,  
20 shall: (a) approve, in whole or in part, the submission; (b)  
21 approve the submission upon specified conditions; (c) modify the  
22 submission to cure the deficiencies; (d) disapprove, in whole or  
23 in part, the submission, directing that the submitting Settlor  
24 modify the submission; or (e) any combination of the above;  
25 however, EPA shall not modify a submission without first  
26 providing the submitting Settlor at least one notice of



1 deficiency and an opportunity to cure within twenty (20) days,  
2 except where to do so would cause serious disruption to the Work  
3 or where previous submission(s) have been disapproved due to  
4 material defects and the deficiencies in the submission under  
5 consideration indicate a bad faith lack of effort to submit an  
6 acceptable deliverable.

7           57. In the event of approval, approval upon  
8 conditions, or modification by EPA, pursuant to Paragraph 56(a),  
9 (b), or (c), the submitting Settlor shall proceed to take any  
10 action required of it by the plan, report, or other item, as  
11 approved or modified by EPA subject only to its right to invoke  
12 the Dispute Resolution procedures set forth in Section XXII  
13 (Dispute Resolution) with respect to the modifications or  
14 conditions made by EPA. In the event that EPA modifies the  
15 submission to cure the deficiencies pursuant to Paragraph 56(c)  
16 and the submission has a material defect, EPA retains its right  
17 to seek stipulated penalties, as provided in Section XXIII  
18 (Stipulated Penalties) and subject to the procedures of Section  
19 XXII (Dispute Resolution).

20           58.a. Upon receipt of a notice of disapproval pursuant  
21 to Paragraph 56(d), the submitting Settlor shall, within fifteen  
22 (15) days or such longer time as specified by EPA in such notice  
23 or as otherwise agreed to in writing between EPA and the  
24 submitting Settlor, correct the deficiencies and resubmit the  
25 plan, report, or other item for approval. No stipulated  
26 penalties shall accrue during the first opportunity to cure a



1 deliverable's or submission's deficiency(ies). In the event that  
2 a resubmitted deliverable or other submission, or portion  
3 thereof, is again disapproved by EPA, stipulated penalties shall  
4 begin to accrue from the date of the resubmittal.

5           b. Notwithstanding the receipt of a notice of  
6 disapproval pursuant to Paragraph 56(d), the submitting Settlor  
7 shall proceed, at the direction of EPA, to take any action  
8 required by any non-deficient portion of the submission.  
9 Implementation of any non-deficient portion of a submission shall  
10 not relieve the submitting Settlor of any liability for  
11 stipulated penalties under Section XXIII (Stipulated Penalties).

12           59. In the event that a resubmitted plan, report, or  
13 other item, or portion thereof, is disapproved by EPA, EPA may  
14 again require the submitting Settlor to correct the deficiencies,  
15 in accordance with the preceding paragraphs. EPA also retains  
16 the right to modify or develop the plan, report, or other item.  
17 The submitting Settlor shall implement any such plan, report, or  
18 item as modified or developed by EPA, subject only to its right  
19 to invoke the procedures set forth in Section XXII (Dispute  
20 Resolution).

21           60. If upon resubmission, a plan, report, or item is  
22 disapproved or modified by EPA due to a material defect, and the  
23 submitting Settlor fails to cure the defect, that submitting  
24 Settlor shall be deemed to have failed to submit such plan,  
25 report, or item timely and adequately unless that submitting  
26 Settlor invokes the dispute resolution procedures set forth in



1 Section XXII (Dispute Resolution) and EPA's action is overturned  
2 or modified pursuant to that section. The provisions of Section  
3 XXII (Dispute Resolution) and Section XXIII (Stipulated  
4 Penalties) shall govern the implementation of the Work and  
5 accrual and payment of any stipulated penalties during Dispute  
6 Resolution. If EPA's disapproval or modification is upheld,  
7 stipulated penalties shall accrue for such violation from the  
8 date on which the initial submission was originally required, as  
9 provided in Section XXIII.

10 61. All plans, reports, and other items required to be  
11 submitted to EPA under this Consent Decree shall, upon approval  
12 or modification by EPA, be enforceable under this Consent Decree.  
13 In the event EPA approves or modifies a portion of a plan,  
14 report, or other item required to be submitted to EPA under this  
15 Consent Decree, the approved or modified portion shall be  
16 enforceable under this Consent Decree.

17 XIII. PROJECT MANAGERS

18 62. All aspects of the Work to be performed by the  
19 Settlers pursuant to this Consent Decree shall be under the  
20 direction and supervision of a qualified project manager, the  
21 selection of which shall be subject to disapproval by EPA.  
22 Within fifteen (15) days after the effective date of this Consent  
23 Decree, each Settlor shall notify EPA, in writing, of the name  
24 and qualifications of the project manager, including primary  
25 support entities and staff, proposed to be used in carrying out  
26 Work under this Consent Decree. If, at any time, a Settlor



1 proposes to use a different Project Manager, that Settlor shall  
2 notify EPA and shall obtain an authorization to proceed from EPA  
3 before the new project manager performs any Work under this  
4 Consent Decree.

5           63. EPA will review each Settlor's selection of a  
6 project manager according to the terms of this Section of the  
7 Decree. If EPA disapproves of the selection of the project  
8 manager, either Waste Management or the Tulalip Tribes, as  
9 appropriate, shall submit to EPA within thirty (30) days after  
10 receipt of EPA's disapproval of the project manager previously  
11 selected, a list of project managers, including primary support  
12 entities and staff, that would be acceptable to that Settlor.  
13 EPA will thereafter provide written notice to that Settlor of the  
14 names of the project managers that it disapproves and an  
15 authorization to proceed with respect to any of the others. That  
16 Settlor may then select any approved project manager from that  
17 list and shall notify EPA of the name of the project manager  
18 selected within twenty-one (21) days of EPA's designation of  
19 approved project managers.

20           64. If a Project Manager or Alternate Project Manager  
21 initially designated is changed, the identity of the successor  
22 will be given to the other Parties at least five (5) working days  
23 before the changes occur, unless impracticable, but in no event  
24 later than the actual day the change is made. Each Settlor's  
25 Project Manager shall be subject to disapproval by EPA pursuant  
26 to this Section of this Decree and shall have the technical



1 expertise sufficient to adequately oversee all aspects of the  
2 Work. Each Settlor's Project Manager shall not be an attorney  
3 for a Settlor in this matter. He or she may assign other  
4 representatives, including other contractors, to serve as a Site  
5 representative for oversight of performance of daily operations  
6 during remedial activities.

7           65. Plaintiff may designate other representatives,  
8 including, but not limited to, EPA employees, and federal  
9 contractors and consultants, to observe and monitor the progress  
10 of any activity undertaken pursuant to this Consent Decree.  
11 EPA's Project Manager and Alternate Project Manager shall have  
12 the authority lawfully vested in a Remedial Project Manager (RPM)  
13 and an On-Scene Coordinator (OSC) by the NCP, 40 C.F.R. Part 300.  
14 In addition, EPA's Project Manager or Alternate Project Manager  
15 shall have authority, consistent with the NCP, to halt any Work  
16 required by this Consent Decree and to take any necessary  
17 response action when s/he determines that conditions at the Site  
18 constitute an emergency situation or may present an immediate  
19 threat to public health or welfare or the environment due to  
20 release or threatened release of Waste Material.

21           XIV. TRANSFER OF SETTLEMENT FUNDS TO WASTE MANAGEMENT

22           A. DISBURSEMENT FROM EPA'S SPECIAL ACCOUNT

23           66. EPA has deposited and will deposit the United  
24 States' proceeds from EPA's de minimis settlements in connection  
25 with the Site, including any interest earned thereon, in a Site-



1 Specific Special Account ("EPA Special Account"), pursuant to  
2 Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3).

3 67. Subject to the terms and conditions set forth in  
4 this Consent Decree, EPA agrees to make available all of the  
5 available funds in the EPA Special Account, up to \$8,889,977, to  
6 Waste Management for performance of response actions under this  
7 Decree. EPA shall disburse such funds from the EPA Special  
8 Account to Waste Management by wire transfer to the following  
9 address:

10 Mellon Bank  
11 Pittsburgh, PA  
12 ABA Routing No. 043000261  
WMX Technologies, Inc.  
Account No. 1979409

13 and notice that such disbursement to Waste Management has been  
14 made by EPA shall be sent to Waste Management at the following  
15 address:

16 Steven D. Richtel  
17 Waste Management, Inc.  
18 3900 South Wadsworth Boulevard  
Suite 800  
Lakewood, CO 80235.

19 Waste Management shall use such funds in the following manner:  
20 within thirty (30) days of the effective date of this Decree, but  
21 not before Waste Management establishes the financial security  
22 specified in Paragraph 78 and Paragraph 76.b., EPA shall disburse  
23 all of the available funds from the EPA Special Account, up to  
24 \$8,889,977. Waste Management agrees to spend this \$8,889,977 and  
25 any Interest Accrued only on the Interim Remedial Action selected  
26 for this Site.



1           68. Waste Management waives all rights to dispute  
2 EPA's determination of the amount of funds within the EPA Special  
3 Account.

4           69. If any funds remain in the EPA Special Account  
5 after disbursement of the \$8,889,977 specified under Paragraph 66  
6 above, EPA may use any portion or all of such remaining funds for  
7 performance of response actions at the Site or cause all or any  
8 portion of such funds to revert to the EPA Hazardous Substance  
9 Superfund.

10       B.    USE OF SETTLEMENT FUNDS RECEIVED FROM OTHER PARTIES

11           70. In accordance with the payment terms contained in  
12 the Generator Defendants Consent Decree, which is lodged and  
13 entered in the United States District Court for the Western  
14 District of Washington, Waste Management will receive \$4,645,457  
15 in settlement funds from the Generator Defendants specified in  
16 that Consent Decree. In addition, in accordance with the payment  
17 terms contained in the SDC Defendants Consent Decree, which is  
18 lodged and entered in the United States District Court for the  
19 Western District of Washington, Waste Management will receive  
20 \$3,164,566 in settlement funds from the SDC Defendants specified  
21 in that Consent Decree. Thus, Waste Management will receive a  
22 total of \$16,700,000 in settlement funds from the EPA Special  
23 Account and from other potentially responsible parties identified  
24 as settling under the three Consent Decrees referenced in this  
25 Paragraph at this Site. In return, Waste Management shall  
26 perform the selected Interim Remedial Action contained in the



1 Interim ROD and will assure that the completed Interim Remedial  
2 Action will meet the Performance Standards contained in the  
3 Interim ROD, and as further delineated in the SOW. In addition,  
4 Waste Management shall be the only Party financially and legally  
5 responsible for any and all cost overruns associated with  
6 construction of the Interim Remedial Action selected in the  
7 Interim ROD. For purposes of this Consent Decree, the term "cost  
8 overruns" does not include costs incurred by Waste Management  
9 under the provisions of Section XVIII (Emergency Response),  
10 Paragraphs 129, 130 and 134 of Section XXIV (Covenants Not To Sue  
11 By Plaintiff), and Section X (Access and Institutional Controls)  
12 of this Decree.

13 C. CERTIFICATION OF EXPENDITURE OF FUNDS FROM THE EPA  
14 SPECIAL ACCOUNT

15 71. After expending \$8,889,977 plus Interest Accrued  
16 toward completion of the Work required by this Consent Decree,  
17 Waste Management may request that the financial security required  
18 by Paragraph 76.b. of this Decree be withdrawn or removed if the  
19 costs expended by Waste Management equal or exceed \$8,889,977  
20 plus Interest Accrued. Such a request must be in the form of a  
21 letter containing a certification and must be accompanied by  
22 supporting documentation. The documentation must include  
23 complete and accurate calculation of at least \$8,889,977 of costs  
24 incurred by Waste Management pursuant to this Decree, including  
25 the Interest Accrued as determined by EPA. Waste Management's  
26



1 certification shall contain the following statement signed by the  
2 chief financial officer of Waste Management:

3 "To the best of my knowledge, after thorough  
4 investigation and review of Waste Management's  
5 detailed cost documentation for performance of  
6 response actions taken under this Consent Decree,  
7 I certify that the information contained in or  
8 accompanying this submittal is true, accurate, and  
complete. I am aware that there are significant  
penalties for submitting false information,  
including the possibility of fine and imprisonment  
for knowing violations."

9 72. Waste Management's submittal of the certification  
10 of costs pursuant to Paragraph 71 above, shall not include costs  
11 incurred by Waste Management for activities taken at or in  
12 relation to the Site by Waste Management for: 1) Remedial  
13 Investigations or Feasibility Studies; 2) project management;  
14 3) fees or taxes of any kind paid by Waste Management or its  
15 contractors or subcontractors to the Tulalip Tribes;  
16 4) activities or expenses by Waste Management or its contractors  
17 or subcontractors relating to any de minimis settlements;  
18 5) legal bills or legal costs associated with Waste Management's  
19 pursuit of other person(s) which might relate in any way to the  
20 Site; 6) any costs Waste Management incurs pursuant to the AOC  
21 for RI/FS to which Waste Management is a signatory; and 7) any  
22 costs Waste Management incurs pursuant to Sections X (for costs  
23 associated with implementation of Institutional Controls or  
24 attorneys fees and legal costs associated with access or  
25 institutional controls), XVIII, or Paragraphs 129, 130, and 134  
26 of Section XXIV of this Decree.



1 D. EPA APPROVAL OF REMOVAL OF FINANCIAL ASSURANCE RELATED  
2 TO FUNDS PROVIDED FROM THE EPA SPECIAL ACCOUNT

3 73. EPA agrees to allow Waste Management to eliminate  
4 the financial security required by Paragraph 76.b. of this  
5 Decree, after EPA's determination that Waste Management has  
6 expended funds that equal or exceed \$8,889,977 plus Interest  
7 Accrued, in performance of the Work required by this Decree. EPA  
8 agrees that it will not unreasonably withhold its approval of  
9 elimination of the financial security required by Paragraph 76.b.  
10 of this Decree.

11 74. In making its determination under Paragraph 73  
12 above, EPA shall provide information, within thirty (30) days  
13 after receiving such a request from Waste Management, as to the  
14 Interest Accrued on the funds Waste Management will be certifying  
15 it has expended. The Interest Accrued will be determined by EPA  
16 in the following manner:

17 a. EPA will determine the length of time, expressed  
18 in terms of months, from the date EPA begins  
19 disbursement of funds from the EPA Special Account  
20 to Waste Management to the date Waste Management  
21 notifies EPA that it has spent the \$8,889,977  
22 provided under this Decree;

23 b. EPA will then identify the available interest rate  
24 in effect for funds in EPA's Hazardous Substances  
25 Superfund during the months identified in  
26 subparagraph 64.a.;



1 c. EPA will then apply the interest rates identified  
2 in subparagraph 64.b. above in effect during the  
3 months identified in subparagraph 64.a., and  
4 through the accrual method for determining  
5 interest, compounded monthly, will determine the  
6 Interest Accrued.

7 75. Waste Management waives all rights to dispute  
8 EPA's determination of the amount of Interest Accrued, except for  
9 instances of accounting error.

10 E. STIPULATED PENALTIES FOR FAILURE TO TIMELY COMPLETE OR  
11 FAILURE TO PROPERLY COMPLETE WORK

12 76.a. In the event that EPA determines, at any time  
13 between the date EPA began disbursement of funds from the EPA  
14 Special Account to Waste Management and the date Waste Management  
15 can establish pursuant to Paragraphs 73 and 74 to EPA's  
16 satisfaction that Waste Management has spent the amount of funds  
17 EPA has disbursed to Waste Management from EPA's Special Account  
18 pursuant to Paragraph 67 of this Decree plus Interest Accrued on  
19 that amount toward performance of the Interim Remedial Action  
20 selected in the Interim ROD, that Waste Management:

- 21 (1) is, regardless of whether Waste Management has  
22 complied with the time frames specified in the SOW  
23 and the EPA-approved Work Plans as such documents  
24 are modified pursuant to the terms of this Decree,  
25 either materially failing to construct or has  
26 materially failed to construct the Interim



1 Remedial Action selected in the Interim ROD in a  
2 manner which will allow the final Interim Remedial  
3 Action to meet the Performance Standards contained  
4 in the Interim ROD and as further delineated in  
5 the SOW attached to this Decree; or

6 (2) is either materially failing to construct or has  
7 materially failed to construct the Interim  
8 Remedial Action selected in the Interim ROD in  
9 accordance with the time frames specified in the  
10 SOW and associated Work Plans, as such documents  
11 are modified pursuant to the terms of this Consent  
12 Decree, wherein such delay in performance of the  
13 Work by Waste Management is not approved by EPA in  
14 writing, or such delay is not otherwise excused by  
15 EPA or the Court in accordance with the terms of  
16 Section XXI (Force Majeure) or Section XXII  
17 (Dispute Resolution) of this Decree;

18 and, based on these material failures by Waste Management, EPA  
19 has issued a stop work order pursuant to Paragraph 134 of this  
20 Decree to Waste Management, then Waste Management agrees that it  
21 shall pay to EPA as a stipulated penalty the amount of funds EPA  
22 has disbursed to Waste Management from EPA's Special Account  
23 pursuant to Paragraph 67 of this Decree plus Interest Accrued on  
24 that amount, provided EPA has disbursed funds from the EPA  
25 Special Account to Waste Management. For purposes of this  
26 Paragraph, Interest shall accrue on the \$8,889,977 from the date



1 EPA began disbursement of funds to Waste Management from the EPA  
2 Special Account to the date EPA notified Waste Management that  
3 the failures of Waste Management specified in subparagraphs (1)  
4 or (2) of this Paragraph have occurred if Waste Management does  
5 not challenge EPA's determination under Section XXII (Dispute  
6 Resolution) of this Decree. If Waste Management does challenge  
7 EPA's determination under Section XXII (Dispute Resolution) of  
8 this Decree, then the date of final determination for Interest  
9 accruing will be the date of EPA's or this Court's final decision  
10 if Waste Management is unsuccessful in challenging EPA's  
11 determination. The remaining methodology for calculating  
12 Interest Accrued under this Paragraph shall be as specified in  
13 Paragraphs 74.b. and 74.c. of this Decree.

14 b. To insure that the \$8,889,977 plus Interest  
15 referenced in Paragraph 76.a. of this Decree is available to EPA  
16 as a stipulated penalty, Waste Management shall, within thirty  
17 (30) days of the effective date of this Consent Decree, establish  
18 financial security in an amount up to \$9,396,706, naming EPA as  
19 beneficiary if payment is triggered under this Paragraph, by  
20 using either of the following forms:

- 21 (1) One or more irrevocable letters of credit  
22 equalling \$9,396,706; or  
23 (2) A trust fund in the amount of \$9,396,706.

24 Waste Management may, after sending written notice to EPA,  
25 establish a lesser amount of financial security if the initial  
26 amount of funds disbursed by EPA to Waste Management from the EPA



1 Special Account is less than \$8,889,977. In that event, the  
2 amount of financial security required shall be determined by EPA  
3 by taking the amount of funds disbursed by EPA to Waste  
4 Management from the EPA Special Account and multiplying that  
5 amount by 5.7 percent, and then adding that resulting amount to  
6 the amount of funds actually disbursed by EPA from the EPA  
7 Special Account to Waste Management. In the event that  
8 additional funds are disbursed by EPA to Waste Management from  
9 the EPA Special Account after the initial disbursement by EPA,  
10 then Waste Management shall increase the amount of financial  
11 security specified in this Paragraph, using the formula and  
12 methodology specified in this Paragraph, before such additional  
13 funds will be disbursed to Waste Management by EPA. Waste  
14 Management shall not be allowed to eliminate the financial  
15 security required under this Paragraph unless and until it can  
16 demonstrate in writing to EPA's satisfaction, as specified in,  
17 Paragraphs 73 and 74 of this Decree, that Waste Management has  
18 spent at least the amount of funds EPA has disbursed to Waste  
19 Management from EPA's Special Account, plus Interest Accrued,  
20 toward satisfactory completion of the Work required under this  
21 Decree. EPA agrees that it will not require payment of the  
22 financial assurance from a financial institution selected by  
23 Waste Management under this Paragraph unless and until there has  
24 been a final administrative decision by EPA regarding payment of  
25 such financial assurance to EPA and this decision has not been  
26 appealed to the District Court, or unless and until the District



1 Court has issued a final judicial decision regarding payment of  
2 such financial assurance. If the District Court's decision is  
3 appealed by EPA or Waste Management, Waste Management shall place  
4 the disputed amount of financial assurance into an interest-  
5 bearing escrow account within sixty (60) days of receipt of the  
6 District Court's decision or order. Within fifteen (15) days of  
7 receipt of the final appellate court decision, the escrow agent  
8 shall pay the balance of the account to EPA or to Waste  
9 Management to the extent that it prevails.

10 c. In the event that EPA determines, at any time  
11 between the date EPA notifies Waste Management in writing  
12 pursuant to Paragraphs 73 and 74 of this Decree that Waste  
13 Management may withdraw the financial security required by  
14 Paragraph 76.b. of this Decree and the date EPA issues its  
15 Certification of Completion of the Interim Remedial Action  
16 pursuant to Section XVII of this Decree, that Waste Management:

- 17 (1) is, regardless of whether Waste Management has  
18 complied with the time frames specified in the SOW  
19 and the EPA-approved Work Plans as such documents  
20 are modified pursuant to the terms of this Decree,  
21 either materially failing to construct or has  
22 materially failed to construct the Interim  
23 Remedial Action selected in the Interim ROD in a  
24 manner which will allow the final Interim Remedial  
25 Action to meet the Performance Standards contained  
26



1 in the Interim ROD and as further delineated in  
2 the SOW attached to this Decree; or

3 (2) is either materially failing to construct or has  
4 materially failed to construct the Interim  
5 Remedial Action selected in the Interim ROD in  
6 accordance with the time frames specified in the  
7 SOW and associated Work Plans, as such documents  
8 are modified pursuant to the terms of this Consent  
9 Decree, wherein such delay in performance of the  
10 Work by Waste Management is not approved by EPA in  
11 writing, or such delay is not otherwise excused by  
12 EPA or the Court in accordance with the terms of  
13 Section XXI (Force Majeure) or Section XXII  
14 (Dispute Resolution) of this Decree;

15 and, based on these material failures by Waste Management, EPA  
16 has issued a stop work order pursuant to Paragraph 134 of this  
17 Decree to Waste Management, then Waste Management agrees that it  
18 shall pay to EPA as a stipulated penalty one and one-half (1 1/2)  
19 times the amount of costs EPA incurs in completing the Work  
20 required of Waste Management under this Decree as specified in  
21 the Interim ROD and as further delineated in the SOW and  
22 associated Work Plans, plus Interest Accrued on EPA's costs which  
23 shall accrue from the date Waste Management received EPA's  
24 written notice that EPA had taken over performance of the Work  
25 required of Waste Management under this Decree to the date of  
26 payment. The remaining methodology for calculating Interest



Accrued under this Paragraph shall be as specified in Paragraphs 74.b. and 74.c. of this Decree. In lieu of Waste Management's stipulated penalty payment of one and one-half (1 1/2) times the amount of costs EPA incurs completing the Work required of Waste Management under this Decree plus Interest Accrued, EPA may instead elect at EPA's sole discretion to seek treble damages, as well as EPA's actual costs of completing the Work plus Interest Accrued, from Waste Management pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3).

77. The payment of the stipulated penalty amounts specified in Paragraphs 76.a. and 76.c. above shall be paid by Waste Management to EPA within thirty (30) days of receipt of a written notice from EPA that such payment is due, unless Waste Management invokes the procedures of Section XXII (Dispute Resolution) of this Consent Decree. This payment shall be sent to EPA in accordance with the payment procedures specified in Paragraph 100 of this Decree. Any disputes or disagreements regarding whether Waste Management has failed to properly construct the remedy selected in the Interim ROD or has failed to construct the remedy selected in the Interim ROD within the time frames specified in the SOW and associated Work Plans shall be subject to the procedures of Section XXII (Dispute Resolution) of this Decree. EPA and Waste Management also hereby agree that any subsequent appeal of EPA's final administrative decision regarding whether Waste Management is materially failing or has materially failed to properly construct the Interim Remedial



1 Action selected in the Interim ROD in a manner which will allow  
2 the final Interim Remedial Action to meet the Performance  
3 Standards contained in the Interim ROD and as further delineated  
4 in the SOW attached to this Decree, or whether EPA has properly  
5 issued a stop work order to Waste Management pursuant to  
6 Paragraphs 76.a., 76.c., and 134 of this Decree, shall be  
7 reviewed by the Court using EPA's administrative record under an  
8 "arbitrary and capricious" standard of review. EPA and Waste  
9 Management also hereby agree that any subsequent appeal of EPA's  
10 final administrative decision regarding:

11 (a) whether Waste Management is materially failing or  
12 has materially failed to construct the Interim  
13 Remedial Action selected in the Interim ROD within  
14 the time frames specified in the SOW and  
15 associated Work Plans, as such documents are  
16 modified pursuant to the terms of this Consent  
17 Decree, wherein such delay in performance of the  
18 Work by Waste Management is not approved by EPA in  
19 writing, or such delay is not otherwise excused by  
20 EPA or the Court in accordance with the terms of  
21 Section XXI (Force Majeure) or Section XXII  
22 (Dispute Resolution) of this Decree; or

23 (b) whether the response costs EPA incurs by virtue of  
24 EPA's takeover of the Work required of Waste  
25 Management under this Decree were incurred in  
26



1                   accordance with CERCLA and the NCP, plus Interest  
2                   Accrued on those costs;  
3 shall be reviewed by the Court de novo, and Waste Management  
4 shall have the burden to prove under a "preponderance of the  
5 evidence" standard of review that EPA's decision that there has  
6 been a "material failure to construct within the time frames  
7 specified in the SOW and associated Work Plans" under  
8 subparagraph (a) above was improper, or that the costs EPA incurs  
9 by virtue of taking over the Work required of Waste Management  
10 under this Decree were not properly incurred by EPA under CERCLA  
11 and the NCP. Waste Management and EPA also hereby agree that  
12 Waste Management will not be allowed to dispute the amount of the  
13 stipulated penalty specified in Paragraph 76.a. or the amount of  
14 the multiplier (1 1/2) specified in Paragraph 76.c. Interest  
15 shall continue to accrue on the stipulated penalty amounts  
16 specified in Paragraphs 76.a. and 76.c. of this Decree during any  
17 dispute resolution period under the terms of Section XXII  
18 (Dispute Resolution) of this Decree or during any appeal to the  
19 Court pursuant to this Paragraph of EPA's final decision. Upon  
20 final resolution of such dispute, the stipulated penalties  
21 specified in Paragraphs 76.a. and 76.c., plus Interest Accrued  
22 thereon, shall be paid to EPA within thirty (30) days of  
23 resolution of such dispute pursuant to the procedures specified  
24 in Paragraph 100 of this Decree.



1                   XV. ASSURANCE OF ABILITY TO COMPLETE WORK

2                   78. Within thirty (30) days of entry of this Consent  
3 Decree, Waste Management shall establish and maintain financial  
4 security in the amount of \$16,700,000.00 in one or more of the  
5 following forms:

- 6                   a. A surety bond guaranteeing performance of the  
7                   Work;  
8                   b. One or more irrevocable letters of credit  
9                   equalling the total estimated cost of the  
10                  Work;  
11                  c. A trust fund;  
12                  d. A guarantee to perform the Work by one or  
13                  more parent corporations or subsidiaries, or  
14                  by one or more unrelated corporations that  
15                  have a substantial business relationship with  
16                  Waste Management; or  
17                  e. A demonstration that Waste Management  
18                  satisfies the requirements of 40 C.F.R.  
19                  § 264.143(f).

20                  79. If Waste Management seeks to demonstrate the  
21 ability to complete the Work through a guarantee by a third party  
22 pursuant to Paragraph 78.d. of this Consent Decree, Waste  
23 Management shall demonstrate that the guarantor satisfies the  
24 requirements of 40 C.F.R. § 264.143(f). If Waste Management  
25 seeks to demonstrate its ability to complete the Work by means of  
26 the financial test or the corporate guarantee pursuant to



Paragraph 78.d. or 78.e., it shall resubmit sworn statements conveying the information required by 40 C.F.R. § 264.143(f) annually, on the anniversary of the effective date of this Consent Decree.

80. In the event that EPA determines at any time that the financial assurances provided pursuant to this section are inadequate, Waste Management shall, within thirty (30) days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in Paragraph 78 of this Consent Decree. Waste Management's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Consent Decree.

81. If Waste Management can show that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 78 above after entry of this Consent Decree, Waste Management may, on any anniversary date of entry of this Consent Decree, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining Work to be performed. Waste Management shall submit a proposal for such reduction to EPA, in accordance with the requirements of this section, and may reduce the amount of the security upon approval by EPA. In the event of a dispute, Waste Management may reduce the amount of the security provided under this Section in



1 accordance with the final administrative or judicial decision  
2 resolving the dispute.

3 82. Waste Management may change the form of financial  
4 assurance provided under Paragraph 78 at any time, upon notice to  
5 and approval by EPA, provided that the new form of assurance  
6 meets the requirements of this Section. In the event of a  
7 dispute, Waste Management may change the form of the financial  
8 assurance only in accordance with the final administrative or  
9 judicial decision resolving the dispute. EPA agrees that it will  
10 not require payment of the financial assurance from a financial  
11 institution selected by Waste Management under this Section  
12 unless and until there has been a final administrative decision  
13 by EPA regarding payment of such financial assurance to EPA which  
14 decision has not been appealed to the District Court, or unless  
15 and until the District Court has issued a final judicial decision  
16 regarding payment of such financial assurance. If the District  
17 Court's decision is appealed by EPA or Waste Management, Waste  
18 Management shall place the disputed amount of financial assurance  
19 into an interest-bearing escrow account within sixty (60) days of  
20 receipt of the District Court's decision or order. Within  
21 fifteen (15) days of receipt of the final appellate court  
22 decision, the escrow agent shall pay the balance of the account  
23 to EPA or to Waste Management to the extent that they prevail.

24 XVI. CLAIMS AGAINST THE SUPERFUND

25 83. If after the entry of this Decree or the SDC  
26 Defendants Consent Decree or the Generator Defendants Consent



Decree, the Generator Defendants or Settling Federal Agencies who settled under the Generator Defendants Consent Decree or the SDC Defendants who settled under the SDC Defendants Consent Decree, have not paid the amounts due, Waste Management may submit to EPA an application for preauthorization pursuant to Sections 111(a)(2), 112, and 122(b)(1) of CERCLA, 42 U.S.C. §§ 9611(a)(2), 9612, and 9622(b)(1), for the unpaid amounts due under this Decree, the SDC Defendants Consent Decree or the Generator Defendants Consent Decree.

84. Waste Management may submit its preauthorization request 120 days after the date that such payment(s) were required by the SDC Defendants Consent Decree or the Generator Defendants Consent Decree, as applicable. Waste Management understands and is in agreement that submitting an application for preauthorization does not constitute preauthorization or approval of a mixed funding settlement.

85. EPA will consider an application for preauthorization and may, in its sole discretion, approve such a preauthorization and authorize Waste Management to submit claims for actions to complete performance or Work required by this Decree, subject to continuing Congressional appropriation at funding levels sufficient to support the current pace of cleanup. Reimbursement from the Fund shall be subject to the provisions of Section 112 of CERCLA, the regulations set forth in 40 CFR Part 307, and any other applicable claims and audit procedures. Notwithstanding any provision of 40 C.F.R. § 307(i) or EPA's



1 approval of any actions under this Decree, Waste Management may  
2 not submit applications or claims that exceed the sum of the  
3 unpaid amounts identified in Paragraph 83 above.

4           86. Provided that Waste Management has received the  
5 \$16,700,000 in settlement funds pursuant to the terms specified  
6 in the SDC Defendants Consent Decree and the Generator Defendants  
7 Consent Decree, including any claims against the Fund subject to  
8 a preauthorization as set forth in Paragraph 83 above, Waste  
9 Management shall be solely responsible for all cost overruns  
10 associated with: 1) design and construction of the remedy  
11 selected in the Interim ROD; 2) Operation and Maintenance costs  
12 which exceed \$168,000 per year for O&M of the cover system and  
13 O&M costs which exceed the annual O&M costs for the gas  
14 collection system (if necessary), as specified in Paragraph 22  
15 above and consistent with the Interim ROD; 3) costs Waste  
16 Management incurs pursuant to Sections VI, X (not including costs  
17 related to institutional controls), XV, XVIII (Waste Management  
18 is sharing costs incurred under this section with certain  
19 Generator Defendants, Settling Federal Agencies, and the Tulalip  
20 Tribes), XIX, XX, XXII, XXIII, XXVIII, and XXXIII of this Decree;  
21 and 4) any other type of attorneys' fees (e.g., fees related to  
22 evaluating or establishing the liability of Waste Management or  
23 any person, pursuing a claim against any other person, defending  
24 a claim by the United States or any other person, evaluating  
25 Waste Management's submissions under, or compliance with, the  
26 terms of this Consent Decree, or advising or representing Waste



1 Management in any action or dispute resolution under this Consent  
2 Decree or in any action or proceeding to enforce this Consent  
3 Decree), and may not submit a claim against the Fund for these  
4 costs.

5 87. Waste Management may not submit any application  
6 for, or any claim(s) against the Fund for costs incurred related  
7 to Work performed that is being addressed through funds disbursed  
8 from EPA's Special Account, or any other work Waste Management  
9 performs using proceeds provided by any other Generator Defendant  
10 or Settling Federal Agency or the SDC Defendants, which is a  
11 party to the SDC Defendants Consent Decree or the Generator  
12 Defendants Consent Decree.

13 88. If EPA approves Waste Management's application for  
14 preauthorization, and Waste Management then submits a claim for  
15 reimbursement under this Section, and if EPA then denies a claim  
16 for reimbursement in whole or in part, it shall notify Waste  
17 Management of the reason for such denial. Within thirty (30)  
18 days after receiving notice of EPA's decision, Waste Management  
19 may request an administrative hearing as provided in Section  
20 112(b)(2) of CERCLA, 42 U.S.C. § 9612(b)(2), and 40 C.F.R.  
21 Part 307. If EPA fails to pay Waste Management's claim within  
22 sixty (60) days of receipt of a perfected claim, as defined in  
23 40 C.F.R. § 307(14), interest shall accrue on the amount due and  
24 payable to Waste Management.

25 89. If EPA approves Waste Management's application for  
26 preauthorization, pursuant to Section 112(c)(1) of CERCLA,



1 42 U.S.C. § 9612(c)(1), Waste Management hereby subrogates its  
2 right to the United States to recover from other parties any  
3 costs reimbursed to Waste Management under this Section, and  
4 Waste Management and Waste Management's contractors shall assist  
5 in any action to recover these costs which may be initiated by  
6 the United States. All of Waste Management's contracts for  
7 implementing the preauthorization decision document shall include  
8 a specific requirement that the contractors agree to provide this  
9 cost recovery assistance to the United States. The cost recovery  
10 assistance shall include, but not be limited to, furnishing the  
11 personnel, services, documents, and materials requested by the  
12 United States to assist the United States in documenting the work  
13 performed and costs expended by Waste Management or Waste  
14 Management's contractors at the Site in order to aid in cost  
15 recovery efforts. Assistance shall also include providing all  
16 requested assistance in the interpretation of evidence and costs,  
17 and providing requested testimony.

18 90. If Waste Management does not receive a total of  
19 \$16,700,000 from EPA's Special Account and from settlement  
20 proceeds from the settling parties in the Generator Defendants  
21 Consent Decree and the SDC Defendants Consent Decree, and if EPA  
22 disapproves Waste Management's application for preauthorization,  
23 which may be submitted after the effective date of this Decree  
24 pursuant to Paragraph 83 above, then Waste Management shall  
25 continue to perform the Work required of it under this Decree  
26 until such time that Waste Management has spent or encumbered



1 eighty (80) percent of the funds disbursed to it from EPA and by  
2 Settling Defendants on design and construction of the Interim  
3 Remedial Action. At such time, Waste Management shall provide  
4 documentation and certify as to expenditure or encumbrance of 80  
5 percent of the funds received and shall meet with EPA to discuss  
6 what Work, demobilization, and Site stabilization can be  
7 performed with the remaining funds available. Waste Management  
8 shall use the remaining twenty (20) percent of funds available  
9 for Work as specified in the SOW, reasonable and necessary costs  
10 for demobilization of construction personnel, stabilization of  
11 the Site to minimize adverse impacts to remedial actions already  
12 performed or in progress, and to maintain security at the Site.  
13 After Waste Management certifies to EPA that it has spent 100  
14 percent of the funds received from EPA or settling parties, plus  
15 Interest Accrued on those funds, on Work specified in this  
16 Decree, then Waste Management's remaining obligations under this  
17 Consent Decree shall be suspended until such time that Waste  
18 Management receives additional settlement funds either from other  
19 settling parties or additional funds disbursed by EPA to Waste  
20 Management. At that time, Waste Management and EPA shall again  
21 meet to decide what additional Work can be done by Waste  
22 Management with such additional settlement funds or funds  
23 disbursed by EPA to Waste Management.

24 91. Waste Management shall not make any claim against  
25 the Fund for any administrative costs incurred, including but not  
26 limited to, the submission(s) for preauthorization, any



1 submittals for reimbursement, or resolution of a claim, or any  
2 actions that may be required of Waste Management pursuant to  
3 Paragraph 83 of this Section.

4           92. Waste Management's ability to submit an  
5 application for preauthorization, or if after EPA approves Waste  
6 Management's preauthorization request Waste Management is  
7 provided funds pursuant to a Consent Decree entered into by  
8 another party who is not a signatory to this Consent Decree or  
9 the Generator Defendants Consent Decree, or the SDC Defendants  
10 Consent Decree, or from EPA's Special Account, then Waste  
11 Management's ability to seek preauthorization will be  
12 extinguished. In the situation where the additional funds  
13 provided to Waste Management by EPA is less than the shortfall  
14 identified in Paragraph 83 above, then the maximum amount Waste  
15 Management may claim against the Fund will be reduced by the  
16 amount that Waste Management receives from such settlement  
17 proceeds.

18           XVII. CERTIFICATION OF COMPLETION

19           93. Completion of the Interim Remedial Action

20           a. Within thirty (30) days after Waste Management  
21 concludes that the Interim Remedial Action has been fully  
22 performed and the Performance Standards as specified in the  
23 Interim ROD and as further delineated in the SOW have been  
24 attained, Waste Management shall schedule and conduct a pre-  
25 certification inspection to be attended by Waste Management and  
26 EPA. If, after the pre-certification inspection, Waste



1 Management still believes that the Interim Remedial Action has  
2 been fully performed and the Performance Standards as specified  
3 in the Interim ROD and as further delineated in the SOW have been  
4 attained, it shall submit a written Interim Remedial Action  
5 Report requesting certification to EPA for approval pursuant to  
6 Section XIII (EPA Approval of Plans and Other Submissions) within  
7 sixty (60) days of the inspection. In the report, a registered  
8 professional engineer and Waste Management's Project Manager  
9 shall state that the Interim Remedial Action has been completed  
10 in full satisfaction of the requirements of this Consent Decree.  
11 The written report shall include as-built drawings signed and  
12 stamped by a professional engineer. The report shall contain the  
13 following statement, signed by a responsible corporate official  
14 of Waste Management or Waste Management's Project Manager:

15 "To the best of my knowledge, after thorough investigation,  
16 I certify that the information contained in or accompanying  
17 this submission is true, accurate, and complete. I am aware  
18 that there are significant penalties for submitting false  
information, including the possibility of fine and  
imprisonment for knowing violations."

19 If, after completion of the pre-certification inspection and  
20 receipt and review of the written report, EPA determines that the  
21 Interim Remedial Action or any portion thereof has not been  
22 completed in accordance with this Consent Decree or that the  
23 Performance Standards as specified in the Interim ROD and as  
24 further delineated in the SOW have not been achieved, EPA will  
25 notify Waste Management, in writing, of the activities that must  
26 be undertaken by Waste Management pursuant to this Consent Decree



1 to complete the Interim Remedial Action and achieve the  
2 Performance Standards as specified in the Interim ROD and as  
3 further delineated in the SOW. Provided, however, that EPA may  
4 only require Waste Management to perform such activities pursuant  
5 to this paragraph to the extent that such activities are  
6 consistent with the "scope of the remedy selected in the Interim  
7 ROD", as that term is defined in Paragraph 21.b. EPA will set  
8 forth in the notice a schedule for performance of such activities  
9 consistent with the Consent Decree and the SOW, or require Waste  
10 Management to submit a schedule to EPA for approval pursuant to  
11 Section XII (EPA Approval of Plans and Other Submissions). Waste  
12 Management shall perform all activities described in the notice  
13 in accordance with the specifications and schedules established  
14 pursuant to this paragraph, subject to its right to invoke the  
15 dispute resolution procedures set forth in Section XXII  
16 (Dispute Resolution).

17           b. If EPA concludes, based on the initial or any  
18 subsequent report requesting Certification of Completion that the  
19 Interim Remedial Action has been performed in accordance with  
20 this Consent Decree and that the Performance Standards have been  
21 achieved, EPA will so certify, in writing, to Waste Management.  
22 This certification shall constitute the Certification of  
23 Completion of the Interim Remedial Action for purposes of this  
24 Consent Decree, including, but not limited to, Section XXIV  
25 (Covenants Not to Sue by Plaintiff). EPA agrees that it will not  
26 unreasonably withhold issuance of its Certification of Completion



1 of Interim Remedial Action to Waste Management under the terms of  
2 this Paragraph. Certification of Completion of the Interim  
3 Remedial Action shall not affect Waste Management's obligations  
4 under this Consent Decree to perform activities (including  
5 initial O&M activities) necessary to achieve Performance  
6 Standards set out in the Interim ROD and as further delineated in  
7 the SOW for a period of three (3) years (or longer period of time  
8 to be determined by EPA and Waste Management in writing pursuant  
9 to the criteria specified in Section 4.6.4 of the SOW attached as  
10 Appendix B to this Decree, but in any event not to exceed five  
11 (5) years) from the date of Certification of Completion, to fund  
12 or perform further response actions in accordance with Paragraph  
13 37 of this Decree, to retain records in accordance with Section  
14 XXVIII (Retention of Records) or with respect to the United  
15 States' reservation of rights pursuant to Section XXIV (Covenants  
16 Not To Sue By Plaintiff) of this Decree.

17 94. Completion of Operations & Maintenance

18 a. Within thirty (30) days after the Tulalip Tribes  
19 conclude that the O&M has been fully performed, the Tulalip  
20 Tribes shall schedule and conduct a pre-certification inspection  
21 to be attended by the Tulalip Tribes and EPA. If, after the pre-  
22 certification inspection, the Tulalip Tribes still believe that  
23 the O&M portion of the Work has been fully performed, the Tulalip  
24 Tribes shall submit a written report by the Tribes' project  
25 manager stating that the O&M portion of the Work has been  
26 completed in full satisfaction of the requirements of this



1 Consent Decree. The report shall contain the following  
2 statement, signed by a responsible official of the Tulalip Tribes  
3 or the Tulalip Tribes' Project Manager:

4 "To the best of my knowledge, after thorough investigation,  
5 I certify that the information contained in or accompanying  
6 this submission is true, accurate, and complete. I am aware  
7 that there are significant penalties for submitting false  
8 information, including the possibility of fine and  
9 imprisonment for knowing violations."

10 If, after review of the written report, EPA determines that any  
11 O&M portion of the Work has not been completed in accordance with  
12 this Consent Decree, EPA will notify the Tulalip Tribes, in  
13 writing, of the activities that must be undertaken by the Tulalip  
14 Tribes pursuant to this Consent Decree to complete the O&M  
15 portion of the Work. Provided, however, that EPA may only  
16 require the Tulalip Tribes to perform such activities pursuant to  
17 this paragraph to the extent that such activities are consistent  
18 with the "scope of the remedy selected in the Interim ROD", as  
19 that term is defined in Paragraph 21.b. EPA will set forth in  
20 the notice a schedule for performance of such activities  
21 consistent with the Consent Decree and the SOW or require the  
22 Tulalip Tribes to submit a schedule to EPA for approval pursuant  
23 to Section XII (EPA Approval of Plans and Other Submissions).  
24 The Tulalip Tribes shall perform all activities described in the  
25 notice in accordance with the specifications and schedules  
26 established therein, subject to their right to invoke the dispute  
27 resolution procedures set forth in Section XXII (Dispute  
28 Resolution).



1           b.    If EPA concludes, based on the initial or any  
2 subsequent request for Certification of Completion by the Tulalip  
3 Tribes that the O&M portion of the Work has been performed in  
4 accordance with this Consent Decree, EPA will so notify the  
5 Tulalip Tribes, in writing.

6                           XVIII.   EMERGENCY RESPONSE

7           95.   In the event of any action or occurrence during  
8 the construction of the cover system by Waste Management which  
9 causes or threatens a release of Waste Material from the Site  
10 that constitutes an emergency situation or may present an  
11 immediate threat to public health, welfare, or the environment,  
12 Generator Defendants, Settling Federal Agencies, Waste Management  
13 and the Tulalip Tribes shall be responsible for all costs of the  
14 response action or actions taken pursuant to this Section not  
15 inconsistent with the NCP. Such reimbursements shall be made  
16 pursuant to Section XIX (Reimbursement of Response Costs). Any  
17 disputes regarding a Settlor's obligation to reimburse response  
18 costs incurred pursuant to this Section shall be subject to the  
19 provisions of Section XXII (Dispute Resolution) of this Decree.  
20 This Paragraph does not apply to the Seattle School District or  
21 the SDC Defendants and their Related Entities.

22           96.   Subject to Section XXIV (Covenants Not to Sue by  
23 Plaintiff), nothing in this Consent Decree shall be deemed to  
24 limit any authority of the United States (a) to take all  
25 appropriate action to protect human health and the environment or  
26 to prevent, abate, respond to, or minimize an actual or



1 threatened release of Waste Material on, at, or from the Site, or  
2 (b) to direct or order such action, or seek an order from the  
3 Court, to protect human health and the environment or to prevent,  
4 abate, respond to, or minimize an actual or threatened release of  
5 Waste Material on, at, or from the Site. The Settlers reserve,  
6 and this Consent Decree is without prejudice to, rights of the  
7 Settlers to contest or defend against any such action taken  
8 pursuant to this Paragraph.

9           97. Generator Defendants, the Tulalip Tribes, and  
10 Settling Federal Agencies shall not be responsible for any  
11 response action taken pursuant to this Section which was  
12 necessitated by negligent or wrongful acts or omissions of Waste  
13 Management, its officers, directors, employees, agents,  
14 contractors, subcontractors, and any persons acting on its behalf  
15 or under its control, in carrying out activities related to the  
16 construction of the cover system pursuant to this Decree. The  
17 Generator Defendants, Waste Management, or the Settling Federal  
18 Agencies shall not be responsible for any response action taken  
19 pursuant to this Section which was necessitated by negligent or  
20 wrongful acts or omissions of the Tulalip Tribes or its agents,  
21 contractors, or subcontractors during the construction of the  
22 cover system. The actions of Waste Management or the Tulalip  
23 Tribes shall not be deemed to be negligent or wrongful as long as  
24 that Settlor can demonstrate that it was acting in compliance  
25 with and within the scope of Work Plans approved by EPA or  
26



1 otherwise acting in compliance with and within the scope of an  
2 Order issued by EPA.

3 98. The Seattle School District and the SDC Defendants  
4 and their Related Entities shall not be responsible for costs of  
5 a response action or actions taken pursuant to this Section.

6 XIX. REIMBURSEMENT OF RESPONSE COSTS

7 99. Within thirty (30) days of the effective date of  
8 this Consent Decree, the Tulalip Tribes shall pay to the private  
9 trust account for O&M activities established under Paragraph 23  
10 of this Decree by wire transfer or certified check \$1,000,000.  
11 The Tulalip Tribes shall send notice that such payment has been  
12 made to EPA at the address specified below:

13 Joe Penwell  
14 U.S. Environmental Protection Agency, Region 10  
15 Mail Stop OMP-146  
1200 Sixth Avenue  
Seattle, WA 98101.

16 100. Within thirty (30) days of receipt of notice from  
17 EPA that Additional Response Costs, costs necessary to address  
18 "failure of the selected interim remedy," stipulated penalties,  
19 and Interest are due and payable, the Settlor who received such  
20 notice shall send its payment to EPA's Tulalip Landfill Special  
21 Account in the form of a Fedwire electronic Funds Transfer ("EFT"  
22 or wire transfer) or certified or cashier's check or checks made  
23 payable to "EPA Hazardous Substance Superfund" and referencing  
24 EPA Region 10, the Tulalip Landfill Special Account, EPA  
25 Site/Spill ID #10B3, and the name and address of the party making  
26



1 payment. Such Settlor shall send the check(s) to the following  
2 address:

3 Mellon Bank  
4 EPA-Region 10  
5 Attention: Superfund Accounting  
6 P.O. Box 360903M  
7 Pittsburgh, PA 15251.

8 Any payments made pursuant to this Paragraph shall be deposited  
9 in the Tulalip Landfill Special Account within the EPA Hazardous  
10 Substances Superfund to be retained and used to conduct or  
11 finance the response action at or in connection with the Site.

12 Any balance remaining in the Tulalip Landfill Special Account  
13 shall be transferred by EPA to the EPA Hazardous Substances  
14 Superfund. A Settlor shall send notice that the payments  
15 required pursuant to this Paragraph as specified in Section XXIX  
16 (Notices and Submissions) and to Joseph Penwell, Regional  
17 Financial Management Officer, Mail Stop OMP-146, 1200 6th Avenue,  
18 Seattle, Washington 98101.

19 101. A Settlor may contest payment of any Additional  
20 Response Costs if it determines that the United States has made  
21 an accounting error or if it alleges that a cost item that is  
22 included represents costs that are inconsistent with the NCP or  
23 is not otherwise required by this Decree. Such objection shall  
24 be made, in writing, within thirty (30) days of receipt of the  
25 bill and must be sent to the United States pursuant to Section  
26 XXIX (Notices and Submissions). Any such objection shall  
27 specifically identify the contested Additional Response Costs and  
28 the basis for objection. In the event of an objection, the



1 objecting Settlor shall, within the thirty (30) day period, pay  
2 all uncontested Additional Response Costs to the United States in  
3 the manner described in Paragraph 100. Simultaneously, the  
4 objecting Settlor shall establish an interest-bearing escrow  
5 account in a federally-insured bank duly chartered in the State  
6 of Washington and remit to that escrow account funds equivalent  
7 to the amount of the contested Additional Response Costs. The  
8 objecting Settlor shall send to the United States, as provided in  
9 Section XXIX (Notices and Submissions), a copy of the transmittal  
10 letter and check paying the uncontested Additional Response  
11 Costs, and a copy of the correspondence that establishes and  
12 funds the escrow account, including, but not limited to,  
13 information containing the identity of the bank and bank account  
14 under which the escrow account is established as well as a bank  
15 statement showing the initial balance of the escrow account.  
16 Simultaneously with establishment of the escrow account, the  
17 objecting Settlor shall initiate the Dispute Resolution  
18 procedures in Section XXII (Dispute Resolution). If the  
19 United States prevails in the dispute, within five (5) days of  
20 the resolution of the dispute, the objecting Settlor shall pay  
21 the sums due (with accrued interest) to the United States in the  
22 manner described in Paragraph 100. If the objecting Settlor  
23 prevails concerning any aspect of the contested costs, the  
24 objecting Settlor shall pay that portion of the costs (plus  
25 associated accrued interest) for which it did not prevail to the  
26 United States in the manner described in Paragraph 100; the



1 objecting Settlor shall be disbursed any balance of the escrow  
2 account. The dispute resolution procedures set forth in this  
3 paragraph in conjunction with the procedures set forth in Section  
4 XXII (Dispute Resolution) shall be the exclusive mechanisms for  
5 resolving disputes regarding a Settlor's obligation to reimburse  
6 the United States for its Additional Response Costs, payment of  
7 which is provided for in this Consent Decree.

8           102. In the event that the payment required by  
9 Paragraph 99 is not made by the Tulalip Tribes as specified in  
10 Paragraph 99, or the payment(s) required of a Settlor by  
11 Paragraph 100 is not made within thirty (30) days of its receipt  
12 of EPA's notice, the Settlor(s) obligated to make the payment  
13 shall pay Interest on any unpaid balance(s). The Interest on the  
14 payments required by Paragraph 99 shall begin to accrue on the  
15 effective date of this Consent Decree. The Interest on the  
16 payments required by Paragraph 100 shall begin to accrue on the  
17 date of EPA's notice. The Interest on the payments required by  
18 Paragraphs 99 and 100 shall accrue through the date of payment.  
19 Payments of Interest made under this paragraph shall be in  
20 addition to such other remedies or sanctions available to  
21 Plaintiffs by virtue of a Settlor's failure to make timely  
22 payments under this section. A Settlor shall make all payments  
23 required by this paragraph in the manner described in  
24 Paragraphs 99 or 100, as applicable.



1                   XX.   INDEMNIFICATION AND INSURANCE

2                   103.a.   The United States does not assume any liability  
3 by entering into this agreement or by virtue of any designation  
4 of Waste Management as EPA's authorized representatives under  
5 Section 104(e) of CERCLA, 42 U.S.C. § 9604(e).   Waste Management  
6 shall indemnify, save and hold harmless the United States and the  
7 Tulalip Tribes and their officials, agents, employees,  
8 contractors, subcontractors, or representatives for or from any  
9 and all claims or causes of action arising from, or on account  
10 of, negligent or other wrongful acts or omissions of Waste  
11 Management, its officers, directors, employees, agents,  
12 contractors, subcontractors, and any persons acting on its behalf  
13 or under its control, in carrying out activities pursuant to this  
14 Consent Decree, including, but not limited to, any claims arising  
15 from any designation of Waste Management as EPA's authorized  
16 representatives under Section 104(e) of CERCLA, 42 U.S.C.  
17 § 9604(e).   Further, Waste Management agrees to pay the United  
18 States and the Tulalip Tribes all costs they incur including, but  
19 not limited to, attorneys fees and other expenses of litigation  
20 and settlement arising from, or on account of, claims made  
21 against the United States or the Tulalip Tribes based on  
22 negligent or other wrongful acts or omissions of Waste  
23 Management, its officers, directors, employees, agents,  
24 contractors, subcontractors, and any persons acting on its behalf  
25 or under its control, in carrying out activities pursuant to this  
26 Consent Decree.   The United States and the Tulalip Tribes shall



1 not be held out as a party to any contract entered into by or on  
2 behalf of Waste Management in carrying out activities pursuant to  
3 this Consent Decree unless otherwise agreed to in writing.

4 Neither Waste Management nor any of its contractors shall be  
5 considered an agent of the United States.

6           b.     The United States does not assume any liability by  
7 entering into this agreement or by virtue of any designation of  
8 the Tulalip Tribes as EPA's authorized representatives under  
9 Section 104(e) of CERCLA, 42 U.S.C. § 9604(e). The Tulalip  
10 Tribes shall indemnify, save and hold harmless the United States  
11 and Waste Management and their officials, agents, employees,  
12 contractors, subcontractors, or representatives for or from any  
13 and all claims or causes of action arising from, or on account  
14 of, negligent or other wrongful acts or omissions of the Tulalip  
15 Tribes, its officers, directors, employees, agents, contractors,  
16 subcontractors, and any persons acting on its behalf or under its  
17 control, in carrying out activities pursuant to this Consent  
18 Decree, including, but not limited to, any claims arising from  
19 any designation of the Tulalip Tribes as EPA's authorized  
20 representatives under Section 104(e) of CERCLA, 42 U.S.C.

21 § 9604(e). Further, the Tulalip Tribes agrees to pay the United  
22 States and Waste Management all costs they incur including, but  
23 not limited to, attorneys fees and other expenses of litigation  
24 and settlement arising from, or on account of, claims made  
25 against the United States or Waste Management based on negligent  
26 or other wrongful acts or omissions of the Tulalip Tribes, its



1 officers, directors, employees, agents, contractors,  
2 subcontractors, and any persons acting on its behalf or under its  
3 control, in carrying out activities pursuant to this Consent  
4 Decree. The United States and Waste Management shall not be held  
5 out as a party to any contract entered into by or on behalf of  
6 the Tulalip Tribes in carrying out activities pursuant to this  
7 Consent Decree unless otherwise agreed to in writing. Neither  
8 the Tulalip Tribes nor any of its contractors shall be considered  
9 an agent of the United States.

10 c. The United States shall give the appropriate  
11 Settlor notice of any claim for which the United States plans to  
12 seek indemnification pursuant to Paragraph 103.a. and 103.b., and  
13 shall consult with the Settlers prior to settling such claim.

14 104. Each Settlor waives all claims against the United  
15 States for damages or reimbursement or for set-off of any  
16 payments made or to be made to the United States, arising from or  
17 on account of any contract, agreement, or arrangement between  
18 that Settlor and any person for performance of Work on or  
19 relating to the Site, including, but not limited to, claims on  
20 account of construction delays. In addition, each Settlor shall  
21 indemnify and hold harmless the United States with respect to any  
22 and all claims for damages or reimbursement arising from or on  
23 account of any contract, agreement, or arrangement between that  
24 Settlor and any person for performance of Work on or relating to  
25 the Site, including, but not limited to, claims on account of  
26 construction delays.



1           105. No later than fifteen (15) days before commencing  
2 any on-Site Work, Waste Management shall secure, and shall  
3 maintain comprehensive general liability insurance with limits of  
4 ten (10) million dollars, combined single limit, and automobile  
5 liability insurance with limits of one (1) million dollars,  
6 combined single limit, naming the United States as additional  
7 insureds. In addition, no later than fifteen (15) days before  
8 commencing any on-Site O&M Work, the Tulalip Tribes shall secure,  
9 and shall maintain comprehensive general liability insurance with  
10 limits of five (5) million dollars, combined single limit, and  
11 automobile liability insurance with limits of one (1) million  
12 dollars, combined single limit, naming the United States as  
13 additional insureds. Once Waste Management has begun on-Site O&M  
14 work and after receipt of written approval from EPA, it can  
15 reduce its comprehensive general liability insurance limit from  
16 ten (10) million dollars to five (5) million dollars. In  
17 addition, for the duration of each Settlor's obligations under  
18 this Consent Decree, each Settlor shall satisfy, or shall ensure  
19 that its contractors or subcontractors satisfy, all applicable  
20 laws and regulations regarding the provision of worker's  
21 compensation insurance for all persons performing the Work on  
22 behalf of that Settlor in furtherance of this Consent Decree.  
23 Prior to commencement of the Work under this Consent Decree, each  
24 Settlor shall provide to EPA certificates of such insurance and a  
25 copy of each insurance policy. Each Settlor shall resubmit such  
26 certificates and copies of policies required by this Paragraph



1 each year on the anniversary of the effective date of this  
2 Consent Decree. If a Settlor demonstrates by evidence  
3 satisfactory to EPA that any contractor or subcontractor  
4 maintains insurance equivalent to that described above, or  
5 insurance covering the same risks but in a lesser amount, then,  
6 with respect to that contractor or subcontractor, that Settlor  
7 need provide only that portion of the insurance described above  
8 which is not maintained by the contractor or subcontractor.

9 XXI. FORCE MAJEURE

10 106. "Force Majeure", for purposes of this Consent  
11 Decree, is defined as any event arising from causes beyond the  
12 control of a Settlor, of any entity controlled by a Settlor, or  
13 of a Settlor's contractors, that delays or prevents the  
14 performance of any obligation under this Consent Decree despite a  
15 Settlor's best efforts to fulfill the obligation. The  
16 requirement that a Settlor exercises "best efforts to fulfill the  
17 obligation" includes using best efforts to anticipate any  
18 potential Force Majeure event and best efforts to address the  
19 effects of any potential Force Majeure event (1) as it is  
20 occurring, and (2) following the potential Force Majeure event,  
21 such that the delay is minimized to the greatest extent possible.  
22 "Force Majeure" does not include financial inability to complete  
23 the Work or a failure to attain the Performance Standards as  
24 specified in the Interim ROD and as further delineated in the  
25 SOW.



1           107. If any event occurs or has occurred that may delay  
2 the performance of any obligation under this Consent Decree,  
3 whether or not caused by a Force Majeure event, a Settlor shall  
4 orally notify EPA's Project Manager or, in his or her absence,  
5 EPA's Alternate Project Manager or, in the event both of EPA's  
6 designated representatives are unavailable, the Director of the  
7 Office of Environmental Cleanup, EPA Region 10, within ten (10)  
8 days of when the invoking Settlor first knew that the event might  
9 cause a delay. Within five (5) days thereafter, the invoking  
10 Settlor shall provide to EPA, in writing, an explanation and  
11 description of the reasons for the delay; the anticipated  
12 duration of the delay; all actions taken or to be taken to  
13 prevent or minimize the delay; a schedule for implementation of  
14 any measures to be taken to prevent or mitigate the delay or the  
15 effect of the delay; the invoking Settlor's rationale for  
16 attributing such delay to a Force Majeure event if it intends to  
17 assert such a claim; and a statement as to whether, in the  
18 opinion of the invoking Settlor, such event may cause or  
19 contribute to an endangerment to public health, welfare, or the  
20 environment. The invoking Settlor shall include with any notice  
21 all available documentation supporting its claim that the delay  
22 was attributable to a Force Majeure. Failure to comply with the  
23 above requirements shall preclude the invoking Settlor from  
24 asserting any claim of Force Majeure for that event for the  
25 period of time of such failure to comply, and for any additional  
26 delay caused by such failure. The invoking Settlor shall be



1 deemed to know of any circumstance of which the invoking Settlor,  
2 any entity controlled by the invoking Settlor, or the invoking  
3 Settlor's contractors knew or should have known.

4           108. If EPA agrees that the delay or anticipated delay  
5 is attributable to a Force Majeure event, the time for  
6 performance of the obligations under this Consent Decree that are  
7 affected by the Force Majeure event will be extended by EPA for  
8 such time as is necessary to complete those obligations. An  
9 extension of the time for performance of the obligations affected  
10 by the Force Majeure event shall not, of itself, extend the time  
11 for performance of any other obligation. If EPA does not agree  
12 that the delay or anticipated delay has been or will be caused by  
13 a Force Majeure event, EPA will notify the invoking Settlor, in  
14 writing, of its decision. If EPA agrees that the delay is  
15 attributable to a Force Majeure event, EPA will notify the  
16 invoking Settlor, in writing, of the length of the extension, if  
17 any, for performance of the obligations affected by the Force  
18 Majeure event.

19           109. If the invoking Settlor elects to invoke the  
20 dispute resolution procedures set forth in Section XXII  
21 (Dispute Resolution), it shall do so no later than fifteen (15)  
22 days after receipt of EPA's notice. In any such proceeding, the  
23 invoking Settlor shall have the burden of demonstrating by a  
24 preponderance of the evidence that the delay or anticipated delay  
25 has been or will be caused by a Force Majeure event, that the  
26 duration of the delay or the extension sought was or will be



1 warranted under the circumstances, that best efforts were  
2 exercised to avoid and mitigate the effects of the delay, and  
3 that the invoking Settlor complied with the requirements of  
4 Paragraphs 107 and 108, above. If the invoking Settlor carries  
5 this burden, the delay at issue shall be deemed not to be a  
6 violation by the invoking Settlor of the affected obligation of  
7 this Consent Decree identified to EPA and the Court.

8 XXII. DISPUTE RESOLUTION

9 110. Unless otherwise expressly provided for in this  
10 Consent Decree, the dispute resolution procedures of this section  
11 shall be the exclusive mechanism to resolve disputes arising  
12 under or with respect to this Consent Decree. However, the  
13 procedures set forth in this section shall not apply to actions  
14 by the United States to enforce obligations of the Settlers that  
15 have not been disputed in accordance with this section.

16 111. Other than a dispute regarding a "Mediated  
17 Matter", as that term is defined in Paragraph 112.b. below, any  
18 dispute which arises under or with respect to this Consent Decree  
19 shall in the first instance be the subject of informal  
20 negotiations between the parties to the dispute. The period for  
21 informal negotiations shall not exceed twenty (20) days from the  
22 time the dispute arises, unless it is extended by written  
23 agreement of the parties to the dispute. The dispute shall be  
24 considered to have arisen when one party sends the other parties  
25 a written Notice of Dispute. A dispute regarding a "Mediated  
26 Matter" shall in the first instance shall be subject to the



informal dispute resolution provisions specified in Paragraph 112 below.

112.a. Any dispute of a matter subject to mediation under this Paragraph (hereinafter referred to as the "Mediated Matters") which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other party a written Notice of Dispute. The period for informal negotiations shall not exceed twenty (20) days from the time the dispute arises, unless it is extended by written agreement of the parties to the dispute. After the end of this twenty (20) day period, Waste Management and/or EPA shall have an additional five (5) days to submit a written request for informal mediation of a Mediated Matter. Unless Waste Management or EPA requests mediation of a Mediated Matter specified in Paragraph 112.b. below in Waste Management's or EPA's written request for informal mediation (which must be submitted five (5) days after termination of the twenty (20) day informal negotiation period specified above), then the resolution of the dispute shall proceed under the provisions of Paragraphs 111, and 113 through 116 of this Decree. If Waste Management or EPA requests informal mediation pursuant to this Paragraph, then EPA and Waste Management shall meet to discuss an extension of time for informal resolution of the dispute and to establish informal mediation procedures to govern the use of mediation to assist EPA



1 and Waste Management in resolving the dispute informally. Once  
2 the mediation procedures have been established, such procedures  
3 shall apply to the dispute of a Mediated Matter, rather than the  
4 informal procedures of Paragraph 111. EPA and Waste Management  
5 agree that the mediation provisions established under this  
6 Paragraph will only apply to disputes regarding Mediated Matters.

7 b. For purposes of this Paragraph, the term "Mediated  
8 Matters" shall only include disputes regarding the following:

9 1) EPA's decision under Paragraphs 76.a. and 76.c. of this Decree  
10 that Waste Management is either materially failing to construct  
11 or has materially failed to construct the Interim Remedial Action  
12 selected in the Interim ROD in a manner which will allow the  
13 final Interim Remedial Action to meet the Performance Standards  
14 contained in the Interim ROD and as further delineated in the SOW  
15 attached to this Decree; or 2) EPA's decision under Paragraphs  
16 76.a. and 76.c. of this Decree that Waste Management is either  
17 materially failing to construct or has materially failed to  
18 construct the Interim Remedial Action selected in the Interim ROD  
19 in accordance with the time frames specified in the SOW and  
20 associated Work Plans, as such documents are modified pursuant to  
21 the terms of this Consent Decree, wherein such delay in  
22 performance of the Work by Waste Management is not approved by  
23 EPA in writing, or such delay is not otherwise excused by EPA or  
24 the Court. Discussions regarding a Mediated Matter include all  
25 issues surrounding the dispute, including whether the  
26 administrative record of the dispute compiled by EPA regarding a



1 "Mediated Matter" was compiled by EPA in a fair and equitable  
2 manner and in accordance with CERCLA and the NCP. Unless  
3 otherwise agreed to by EPA and Waste Management in writing, only  
4 Mediated Matters may be the subject of a mediation process.

5 c. If for any reason EPA and Waste Management are  
6 unable to select a mediator, or are unable to approve and execute  
7 a contract for mediation services, or are unable to complete the  
8 mediation within the time periods specified for mediation as  
9 agreed to between EPA and Waste Management, then EPA may proceed  
10 as provided in Paragraphs 113 through 116 of this Consent Decree.

11 d. Unless EPA and Waste Management agree otherwise, in  
12 writing, the mediator's activity shall be as specified in this  
13 Paragraph. The mediator's role shall be to assist in negotiation  
14 between EPA and Waste Management and mediate the dispute. In  
15 order to assist the mediator, if EPA and Waste Management agree,  
16 the parties to the dispute may submit written statements of  
17 position to the mediator. Such statements submitted to the  
18 mediator shall not be part of the administrative record in any  
19 subsequent administrative or judicial proceeding or other future  
20 action regarding the subject matter of the mediation. If it will  
21 assist in resolution of the dispute, and upon request of either  
22 party, the mediator may render an opinion on the merits of the  
23 dispute. Any opinion rendered by the mediator shall not be made  
24 part of the administrative record. Mediation sessions shall not  
25 be recorded verbatim and no formal minutes or transcripts shall  
26 be maintained.



1 e. Any agreement reached by EPA and Waste Management  
2 to resolve a dispute of a "Mediated Matter" under this Paragraph  
3 shall be in writing and signed by both EPA and Waste Management,  
4 and shall be incorporated into and become an enforceable element  
5 of this Consent Decree. If any such agreement is reached between  
6 the parties regarding the dispute of a "Mediated Matter" under  
7 this Paragraph, and the agreement is not signed by both of the  
8 Parties within seven (7) days after the resolution of the  
9 dispute, the agreement shall be null and void, and the Parties  
10 shall then have five (5) days to submit their respective written  
11 Statements of Position to the EPA Region 10 Director of the  
12 Office of Environmental Cleanup as specified in Paragraph 113.a.  
13 below. If after completion of mediation pursuant to this  
14 Paragraph the Parties were unable to reach an agreement resolving  
15 the dispute, then the Parties shall have five (5) days to submit  
16 their respective written Statements of Position to the EPA Region  
17 10 Director of the Office of Environmental Cleanup as specified  
18 in Paragraph 113.a. below. The EPA Region 10 Director of the  
19 Office of Environmental Cleanup will issue a final administrative  
20 decision resolving the dispute pursuant to Paragraph 114.b. of  
21 this Decree, and this final administrative decision shall be  
22 binding on Waste Management, subject only to the right to seek  
23 judicial review pursuant to Paragraph 114.c. and 114.d. of this  
24 Consent Decree.

25 113.a. In the event that the parties cannot resolve a  
26 dispute by informal negotiations under either Paragraph 112 (for



1 disputes regarding "Mediated Matters") or Paragraph 111 (for all  
2 other disputes arising under this Consent Decree), then the  
3 position advanced by EPA shall be considered binding unless,  
4 within five (5) days after the conclusion of the informal  
5 negotiation period, a Settlor invokes the formal dispute  
6 resolution procedures of this section by serving on the  
7 United States a written Statement of Position on the matter in  
8 dispute, including, but not limited to, any factual data,  
9 analysis, or opinion supporting that position and any supporting  
10 documentation relied upon by that invoking Settlor. The  
11 Statement of Position shall specify the invoking Settlor's  
12 position as to whether formal dispute resolution should proceed  
13 under Paragraphs 114 or 115.

14           b. Within fourteen (14) days after receipt of the  
15 invoking Settlor's Statement of Position, EPA will serve on the  
16 invoking Settlor EPA's Statement of Position, including, but not  
17 limited to, any factual data, analysis, or opinion supporting  
18 that position and all supporting documentation relied upon by  
19 EPA. EPA's Statement of Position shall include a statement as to  
20 whether formal dispute resolution should proceed under Paragraph  
21 114 or 115. Within seven (7) days after receipt of EPA's  
22 Statement of Position, the invoking Settlor may submit a Reply.

23           c. If there is disagreement between EPA and the  
24 invoking Settlor as to whether dispute resolution should proceed  
25 under Paragraph 114 or 115, the parties to the dispute shall  
26 follow the procedures set forth in the paragraph determined by



1 EPA to be applicable. However, if the invoking Settlor  
2 ultimately appeals to the Court to resolve the dispute, the Court  
3 shall determine which paragraph is applicable in accordance with  
4 the standards of applicability set forth in Paragraphs 114 and  
5 115.

6 114. Formal dispute resolution for disputes pertaining  
7 to the selection or adequacy of any response action and all other  
8 disputes that are accorded review on the administrative record  
9 under applicable principles of administrative law shall be  
10 conducted pursuant to the procedures set forth in this paragraph.  
11 For purposes of this paragraph, the adequacy of any response  
12 action includes, without limitation: (1) the adequacy or  
13 appropriateness of plans, procedures to implement plans, or any  
14 other items requiring approval by EPA under this Consent Decree;  
15 and (2) the adequacy of the performance of response actions taken  
16 pursuant to this Consent Decree. Nothing in this Consent Decree  
17 shall be construed to allow any dispute by any Settlor regarding  
18 the validity of the Interim ROD's provisions.

19 a. An administrative record of the dispute shall be  
20 maintained by EPA and shall contain all statements of position,  
21 including supporting documentation, submitted pursuant to this  
22 section. Where appropriate, EPA may allow submission of  
23 supplemental statements of position by the parties to the  
24 dispute.

25 b. The Director of the Office of Environmental  
26 Cleanup, EPA Region 10, or his designee, will issue a final



1 administrative decision resolving the dispute based on the  
2 administrative record described in Paragraph 114.a. This  
3 decision shall be binding upon the invoking Settlor, subject only  
4 to the right to seek judicial review pursuant to Paragraph 114.c.  
5 and d.

6 c. Any administrative decision made by EPA pursuant to  
7 Paragraph 114.b. shall be reviewable by this Court, provided that  
8 a motion for judicial review of the decision is filed by the  
9 invoking Settlor with the Court and served on all Parties within  
10 ten (10) days of receipt of EPA's decision. The motion shall  
11 include a description of the matter in dispute, the efforts made  
12 by the parties to resolve it, the relief requested, and the  
13 schedule, if any, within which the dispute must be resolved to  
14 ensure orderly implementation of this Consent Decree. The  
15 United States may file a response to the invoking Settlor's  
16 motion.

17 d. In proceedings on any dispute governed by this  
18 paragraph, the invoking Settlor shall have the burden of  
19 demonstrating that the decision of the Director of the Office of  
20 Environmental Cleanup is arbitrary and capricious or otherwise  
21 not in accordance with law. Judicial review of EPA's decision  
22 shall be on the administrative record compiled pursuant to  
23 Paragraph 114.a.

24 115. Formal dispute resolution for disputes that  
25 neither pertain to the selection or adequacy of any response  
26 action nor are otherwise accorded review on the administrative



1 record under applicable principles of administrative law, shall  
2 be governed by this paragraph.

3           a.     Following receipt of the invoking Settlor's  
4 Statement of Position submitted pursuant to Paragraph 113, the  
5 Director of the Office of Environmental Cleanup, EPA Region 10,  
6 will issue a final decision resolving the dispute. The Office of  
7 Environmental Cleanup Director's decision shall be binding on the  
8 invoking Settlor unless, within ten (10) days of receipt of the  
9 decision, the invoking Settlor files with the Court and serves on  
10 the parties a motion for judicial review of the decision setting  
11 forth the matter in dispute, the efforts made by the parties to  
12 resolve it, the relief requested, and the schedule, if any,  
13 within which the dispute must be resolved to ensure orderly  
14 implementation of the Consent Decree. The United States may file  
15 a response to the invoking Settlor's motion.

16           b.     Notwithstanding Paragraph M of Section I  
17 (Background) of this Consent Decree, judicial review of any  
18 dispute governed by this paragraph shall be governed by  
19 applicable principles of law.

20           116. The invocation of formal dispute resolution  
21 procedures under this section shall not extend, postpone, or  
22 affect in any way any obligation of a Settlor under this Consent  
23 Decree not directly in dispute, unless EPA or the Court agrees  
24 otherwise. Stipulated penalties with respect to the disputed  
25 matter shall continue to accrue but payment shall be stayed  
26 pending resolution of the dispute as provided in Paragraph 121.



1 Notwithstanding the stay of payment, stipulated penalties shall  
2 accrue from the first day of noncompliance with any applicable  
3 provision of this Consent Decree as provided in Section XXIII  
4 (Stipulated Penalties) of this Decree. In the event that Waste  
5 Management or the Tulalip Tribes does not prevail on the disputed  
6 issue, stipulated penalties shall be assessed and paid as  
7 provided in Section XXIII (Stipulated Penalties).

8                   XXIII. STIPULATED PENALTIES

9           117. Each Settlor shall be liable for stipulated  
10 penalties in the amounts set forth in Paragraphs 118, 119, and  
11 120 to the United States for its failure to comply with the  
12 requirements of this Consent Decree specified below, unless  
13 excused under Section XXI (Force Majeure) or excused under  
14 Section XXII (Dispute Resolution). "Compliance" by a Settlor  
15 shall include completion by that Settlor of the activities  
16 required of it under this Consent Decree or any Work Plan or  
17 other plan approved under this Consent Decree identified below in  
18 accordance with all applicable requirements of law, this Consent  
19 Decree, the SOW, any plans or other documents approved by EPA  
20 pursuant to this Consent Decree, and within the specified time  
21 schedules established by and approved under this Consent Decree.

22           118.a. The following stipulated penalties shall accrue  
23 to a non-compliant Settlor per violation per day for any  
24 noncompliance by that Settlor identified in Subparagraph b:



Penalty Per Violation  
Per Day

Period of Noncompliance

\$1,000

1st - - 14th day

\$5,000

15th - - 30th day

\$10,000

31st day and beyond.

b. Activities/Deliverables

(i) Conducting the Work without EPA approval.

(ii) Failure of Waste Management to submit the Remedial Design/Remedial Action Work Plan by the due date specified in the SOW attached to this Decree.

(iii) Failure of Waste Management to submit the Construction Quality Assurance Plan (CQAP) by the due date specified in the SOW attached to this Decree.

(iv) Failure of Waste Management to submit corrected or revised Remedial Design and Remedial Action Work Plans in accordance with Section XIII (EPA Approval of Plans and Other Submissions) by the due date specified in the SOW attached to this Decree.

(v) Failure by Waste Management to initiate Interim Remedial Action or failure by Waste Management to initiate O&M activity in the specified time and in accordance with the plans required by this Consent Decree and the SOW.

(vi) Failure by Waste Management to complete Interim Remedial Action and three (3) years (or longer period of time to be determined by EPA and Waste Management in writing pursuant to the criteria specified in Section 4.6.4 of the SOW attached as Appendix B to this Decree, but in any event not to exceed five (5) years) of O&M activities, or failure by the Tulalip Tribes to complete O&M activities in the specified time and in accordance with the plans required by this Consent Decree and the SOW; as specified in Section VII (Operation and Maintenance) of this Decree.



c. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to the schedules in the SOW attached to this Decree or pursuant to the provisions of this Decree:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$500	1st - - 14th day
\$1,000	15th - - 30th day
\$5,000	31st day and beyond.

119. If any amounts, other than Stipulated Penalties, due to the United States under this Consent Decree are not paid by a Settlor by the required date, that Settlor shall pay to EPA as a stipulated penalty, in addition to the Interest that may be required under this Consent Decree, \$3,000.00 per day that such payment is late. Payments made pursuant to this Paragraph shall be in addition to any other remedies or sanctions available to Plaintiffs by virtue of a Settlor's failure to make timely payments required by this Decree. Payments of stipulated penalties and Interest for late payments due under this Consent Decree shall be paid to EPA's Tulalip Landfill Site-Specific Account pursuant to the payment provisions of Paragraph 100 of this Decree.

120. In the event that EPA assumes performance of a portion or all of the Work required of a Settlor pursuant to Paragraph 134 of Section XXIV (Covenants Not to Sue by



1 Plaintiff), that Settlor shall be liable for a stipulated penalty  
2 in the amount of \$1,000.00 per day until the work has been  
3 completed by EPA, except in the event that EPA has taken over the  
4 Work required of that Settlor due to a lack of funds pursuant to  
5 Sections VII (Operations and Maintenance) or Paragraph 100 of  
6 this Decree.

7           121. All penalties assessed against a Settlor shall  
8 begin to accrue on the day after the complete performance is due  
9 or the day a violation occurs, and shall continue to accrue  
10 through the final day of the correction of the noncompliance or  
11 completion of the activity. However, stipulated penalties shall  
12 not accrue: (1) with respect to a deficient submission under  
13 Section XII (EPA Approval of Plans and Other Submissions), during  
14 the fifteen (15) day grace period provided after the date that  
15 EPA notifies a Settlor of any deficiency; (2) with respect to a  
16 decision by the Director of the Office of Environmental Cleanup,  
17 EPA Region 10, under Paragraph 114.b. or 115.a. of Section XXII  
18 (Dispute Resolution), during the period, if any, beginning on the  
19 twenty-first (21st) day after the date the invoking Settlor's  
20 reply to EPA's Statement of Position is received until the date  
21 that the Director issues a final decision regarding such dispute;  
22 or (3) with respect to judicial review by this Court of any  
23 dispute under Section XXII (Dispute Resolution), during the  
24 period, if any, beginning on the 31st day after the Court's  
25 receipt of the final submission regarding the dispute until the  
26 date that the Court issues a final decision regarding such



1 dispute. Nothing herein shall prevent the simultaneous accrual  
2 of separate penalties for separate violations of this Consent  
3 Decree.

4 122. Following EPA's determination that a Settlor has  
5 failed to comply with a requirement of this Consent Decree, EPA  
6 may give that non-compliant Settlor written notification of the  
7 same and describe the noncompliance. EPA may send the non-  
8 compliant Settlor a written demand for the payment of the  
9 penalties. However, penalties shall accrue as provided in the  
10 preceding paragraph regardless of whether EPA has notified the  
11 non-compliant Settlor of a violation.

12 123. All penalties accruing under this section shall  
13 be due and payable to the United States within thirty (30) days  
14 of a Settlor's receipt from EPA of a demand for payment of the  
15 penalties, unless that Settlor invokes the Dispute Resolution  
16 procedures under Section XXII (Dispute Resolution). All payments  
17 to the United States under this section shall be paid pursuant to  
18 the provisions of Paragraph 100 of this Decree and shall indicate  
19 that the payment is for stipulated penalties.

20 124. The payment of penalties shall not alter in any  
21 way each Settlor's obligation to complete the performance of the  
22 Work required under this Consent Decree.

23 125. Penalties shall continue to accrue as provided in  
24 Paragraph 121 during any dispute resolution period, but need not  
25 be paid until the following:



1           a.    If the dispute is resolved by agreement or by a  
2 decision of EPA that is not appealed to this Court, accrued  
3 penalties determined to be owing shall be paid to EPA within  
4 fifteen (15) days of the agreement or the receipt of EPA's  
5 decision or order. EPA may, as part of the resolution of the  
6 dispute, agree to waive all or part of any accrued penalties;

7           b.    If the dispute is appealed to this Court and the  
8 United States prevails in whole or in part, the invoking Settlor  
9 shall pay all accrued penalties determined by the Court to be  
10 owed to EPA within sixty (60) days of receipt of the Court's  
11 decision or order, except as provided in Subparagraph c below;

12           c.    If the District Court's decision is appealed by  
13 any Party to the dispute, the invoking Settlor shall pay all  
14 accrued penalties determined by the District Court to be owing to  
15 the United States into an interest-bearing escrow account within  
16 sixty (60) days of receipt of the Court's decision or order. ..  
17 Penalties shall be paid into this account, as they continue to  
18 accrue, at least every sixty (60) days. Within fifteen (15) days  
19 of receipt of the final appellate court decision, the escrow  
20 agent shall pay the balance of the account to EPA or to the  
21 invoking Settlor to the extent that it prevails.

22           126.a. If a Settlor fails to pay stipulated penalties  
23 when due, the United States may institute proceedings to collect  
24 the penalties from the non-compliant Settlor, as well as  
25 Interest. The non-compliant Settlor shall pay Interest on the  
26



1 unpaid balance, which shall begin to accrue on the date of demand  
2 made pursuant to Paragraph 122.

3           b. Nothing in this Consent Decree shall be construed  
4 as prohibiting, altering, or in any way limiting the ability of  
5 the United States to seek any other remedies or sanctions against  
6 a Settlor available by virtue of that Settlor's violation of this  
7 Decree or of the statutes and regulations upon which it is based,  
8 including, but not limited to, penalties pursuant to Section  
9 122(1) of CERCLA, 42 U.S.C. § 9622(1). Provided, however, that  
10 the United States shall not seek civil penalties pursuant to  
11 Section 122(1) of CERCLA, 42 U.S.C. § 9622(1), for any violation  
12 for which a stipulated penalty is provided herein, except in the  
13 case of a willful violation of the Consent Decree.

14           127. Notwithstanding any other provision of this  
15 section, the United States may, in its unreviewable discretion,  
16 waive any portion of stipulated penalties that have accrued  
17 pursuant to this Consent Decree.

18           XXIV. COVENANTS NOT TO SUE BY UNITED STATES

19           128. In consideration of the actions that will be  
20 performed by Waste Management under the terms of this Consent  
21 Decree, and in consideration of the payments and the actions that  
22 will be performed by the Tulalip Tribes under the terms of this  
23 Consent Decree, and except as specifically provided in  
24 Paragraph 36 as to the Tulalip Tribes and Paragraph 37 as to  
25 Waste Management of Section VIII, and Paragraphs 129, 130, 132,  
26 and 134 of this Section, the United States covenants not to sue



1 or to take administrative action against Waste Management and its  
2 Related Entities and the Tulalip Tribes and their Related  
3 Entities with respect to the Site pursuant to Sections 106 and  
4 107(a) of CERCLA, Section 7003 of RCRA, Section 311 of the Clean  
5 Water Act as that section pertains to "removal actions and  
6 removal costs" only, and Sections 301 and 309 of the Clean Water  
7 Act with respect to liability for civil penalties for discharges  
8 resulting solely from disposal of Waste Material at On-Source  
9 Areas of the Site prior to issuance of the Interim ROD, or as  
10 otherwise provided in the Interim ROD or the RD/RA Work Plan.  
11 With respect to past and future liability under the CWA specified  
12 above, these covenants not to sue under the CWA shall take effect  
13 for Waste Management upon the date of entry of this Consent  
14 Decree. With respect to past and future liability under CERCLA  
15 and RCRA specified above, the covenants not to sue under CERCLA  
16 and RCRA shall take effect for Waste Management upon EPA's  
17 issuance of EPA's certification of completion of the Interim  
18 Remedial Action pursuant to Paragraph 93.b. of this Decree. With  
19 respect to past and future liability under CERCLA, RCRA and the  
20 CWA specified above, these covenants not to sue shall take effect  
21 for the Tulalip Tribes upon the Tulalip Tribes' payment of the  
22 \$1,000,000 required of the Tribes by Paragraph 99 of Section XIX  
23 (Reimbursement of Response Costs). However, if any Related  
24 Entity of a Settlor asserts any claims or causes of action with  
25 respect to the Site against the United States, which if asserted  
26 by such Settlor would be inconsistent with the Covenants Not To



1 Sue by the Settlers in Paragraphs 138, 140, 141 and 142, the  
2 Covenant Not To Sue by Plaintiff shall be void with respect to  
3 that party or any alter ego of that party bringing the claims or  
4 causes of action. EPA, Waste Management, and the Tulalip Tribes  
5 understand and agree that in the event Waste Management or the  
6 Tulalip Tribes fail to meet their obligations under this Consent  
7 Decree, then EPA may enforce the terms of this Decree against  
8 Waste Management or the Tulalip Tribes, as appropriate, with the  
9 Court, notwithstanding EPA's covenants not to sue contained in  
10 this Decree. In the event of any breach by a Settlor of its  
11 obligations under this Consent Decree, the covenant not to sue  
12 shall remain in effect as to the non-breaching party and its  
13 Related Entities despite such breach. These covenants not to sue  
14 are conditioned upon the satisfactory performance by each Settlor  
15 of its obligations under this Consent Decree. These covenants  
16 not to sue extend only to each Settlor and its Related Entities  
17 and do not extend to any other person.

18           129. United States' Pre-certification reservations.

19           Notwithstanding any other provision of this Consent  
20 Decree, the United States reserves, and this Consent Decree is  
21 without prejudice to, the right to institute proceedings in this  
22 action or in a new action, or to issue an administrative order  
23 seeking to compel a Settlor or its Related Entities (1) to  
24 perform further response actions relating to the Site or (2) to  
25 reimburse the United States for additional costs of response if,  
26



1 prior to Certification of Completion of the Interim Remedial  
2 Action:

3 (i) conditions at the Site, previously unknown to EPA,  
4 are discovered, or  
5 (ii) information, previously unknown to EPA, is  
6 received, in whole or in part,  
7 and these previously unknown conditions or information together  
8 with any other relevant information indicates that the Interim  
9 Remedial Action is not protective of human health or the  
10 environment.

11 130. United States' Post-certification reservations.

12 Notwithstanding any other provision of this Consent  
13 Decree, the United States reserves, and this Consent Decree is  
14 without prejudice to, the right to institute proceedings in this  
15 action or in a new action, or to issue an administrative order  
16 seeking to compel a Settlor or its Related Entities (1) to  
17 perform further response actions relating to the Site or (2) to  
18 reimburse the United States for additional costs of response if,  
19 subsequent to Certification of Completion of the Interim Remedial  
20 Action:

21 (i) conditions at the Site, previously unknown to EPA,  
22 are discovered, or  
23 (ii) information, previously unknown to EPA, is  
24 received, in whole or in part,  
25 and these previously unknown conditions or this information  
26 together with other relevant information indicate that the



1 Interim Remedial Action is not protective of human health or the  
2 environment.

3           131. For purposes of Paragraph 129, the information  
4 and the conditions known to EPA shall include only that  
5 information and those conditions known to EPA as of the date the  
6 Interim ROD was signed and set forth in the Interim Record of  
7 Decision for the Site and the administrative record supporting  
8 the Interim Record of Decision. For purposes of Paragraph 130,  
9 the information and the conditions known to EPA shall include  
10 only that information and those conditions known to EPA as of the  
11 date of EPA's certification of completion of the Interim Remedial  
12 Action and set forth in the Interim Record of Decision, the  
13 administrative record supporting the Interim Record of Decision,  
14 the post-Interim ROD administrative record, or in any information  
15 received by EPA pursuant to the requirements of this Consent  
16 Decree prior to EPA's certification of completion of the Interim  
17 Remedial Action. EPA and Waste Management agree that the terms  
18 "new conditions" or "new information" shall not include a  
19 determination by EPA that the selected Interim Remedial Action,  
20 despite being properly designed and constructed by Waste  
21 Management, in compliance with all obligations and requirements  
22 imposed by EPA, including those under the AOC between EPA and  
23 Waste Management and under this Consent Decree (including the SOW  
24 developed thereto), the Interim ROD (including the performance  
25 standards therein), the Construction Quality Assurance Plan, and  
26 the Operation and Maintenance Plan, has failed to minimize



1 migration of liquids through the landfill. The United States'  
2 reservation of rights in Paragraphs 129 and 130 do not apply to  
3 the Seattle School District or the SDC Defendants and their  
4 Related Entities.

5           132. Notwithstanding any other provision of this  
6 Consent Decree, the United States reserves, and this Consent  
7 Decree is without prejudice to, the right to institute  
8 proceedings in this action or a new action, or to issue an  
9 administrative order seeking the Tulalip Tribes or its Related  
10 Entities to perform further response actions necessary to protect  
11 human health and the environment relating to the Off-Source Areas  
12 of the Site. This Paragraph shall not apply to Waste Management,  
13 and the United States expressly agrees that its covenant not to  
14 sue Waste Management or its Related Entities includes further  
15 response actions related to the Off-Source Areas of the Site, and  
16 also includes "failure of the selected Interim Remedial Action",  
17 except as otherwise provided in Paragraph 37 of this Decree.

18           133. General reservations of rights. The covenants not  
19 to sue set forth above do not pertain to any matters other than  
20 those expressly specified in Paragraph 128, and additionally as  
21 to Waste Management, Paragraph 132. The United States reserves,  
22 and this Consent Decree is without prejudice to, all rights  
23 against the Settlers and their Related Entities with respect to  
24 all other matters including, but not limited to, the following,  
25 provided, however, that claims or causes of action brought by the  
26 United States pursuant to the reservation of rights in this



Paragraph shall not void the contribution protection provided pursuant to this Decree or the covenant not to sue for matters outside the scope of these reservation of rights:

(a) claims based on a failure by a Settlor to meet a requirement of this Consent Decree;

(b) claims based on a failure by Waste Management to fulfill its remaining obligations under the existing Administrative Order on Consent for RI/FS to which Waste Management was a party. Such remaining obligations of Waste Management pursuant to the AOC for RI/FS shall not include implementation of remedial action for the Site. If the Final Comprehensive Baseline Risk Assessment ("CBRA") for the Off-Source Areas of the Site is not released by EPA to the AOC for RI/FS Signatories ("AOC Signatories") by August 29, 1997, then the AOC Signatories, including Waste Management, shall not be responsible for EPA response costs under the AOC for RI/FS which are incurred from August 29, 1997, through the date of issuance of the CBRA to the AOC Signatories. In addition, if by September 30, 1997, EPA fails to send the AOC Signatories a letter containing EPA's decision regarding whether the AOC Signatories will have to prepare either a feasibility study for the Off-Source Areas of the Site which evaluates technical remediation alternatives of wetland sediments in the Off-Source Areas or a more streamlined feasibility study, then the AOC Signatories, including Waste Management, shall not be responsible for EPA response costs under the AOC for RI/FS which are incurred



1 from September 30, 1997, to the date of issuance of the letter to  
2 the AOC Signatories;

3 (c) liability arising from the past, present, or  
4 future disposal, release, or threat of release of Waste Materials  
5 outside of the Site, except to the extent that the sole basis for  
6 liability at another Site is the migration of Waste Materials  
7 from the Site;

8 (d) liability for future placement, transportation,  
9 storage, arrangement for disposal or disposal of Waste Material  
10 at the Site, other than as provided in the Interim ROD, the RD/RA  
11 Work Plan, or otherwise ordered by EPA, and excluding continuing  
12 releases of Waste Material existing at the Site prior to issuance  
13 of the Interim ROD;

14 (e) liability for damages for injury to, destruction  
15 of, or loss of natural resources, and for the costs of any  
16 natural resource damage assessments, including, without  
17 limitation, any such claims brought by or on behalf of any  
18 Settling Federal Agency;

19 (f) criminal liability; and

20 (g) liability for violations by a Settlor of federal  
21 law which occur during or after implementation of the Interim  
22 Remedial Action.

23 134. Work Takeover. In the event EPA determines that a  
24 Settlor has ceased implementation of any portion of the Work  
25 required by it hereunder, is seriously or repeatedly deficient or  
26 late in its performance of the Work, or is implementing the Work



1 in a manner which may cause an endangerment to human health or  
2 the environment, EPA may assume the performance of all or any  
3 portions of the Work as EPA determines necessary. Such a non-  
4 compliant Settlor may invoke the procedures set forth in Section  
5 XXII (Dispute Resolution), Paragraph 114, to dispute EPA's  
6 determination that takeover of the Work is warranted under this  
7 paragraph. Costs incurred by the United States in performing the  
8 Work pursuant to this paragraph shall be considered Additional  
9 Response Costs that the non-compliant Settlor shall pay pursuant  
10 to Section XIX (Reimbursement of Response Costs).

11 135. EPA's approval, under Paragraph 73 of this  
12 Decree, of Waste Management's withdrawal of the financial  
13 security provided by Waste Management, will be withdrawn without  
14 reservation upon EPA's determination that Waste Management  
15 submitted a false, inaccurate, incomplete, or misleading  
16 certification. In the event EPA withdraws its approval for  
17 withdrawal of the financial security, the provisions of  
18 Paragraphs 76.a. and 76.b. will apply. EPA's determinations  
19 under this Paragraph shall be subject to the provisions of  
20 Section XXII (Dispute Resolution) of this Consent Decree.

21 136. Notwithstanding any other provision of this  
22 Consent Decree, the United States retains all authority and  
23 reserves all rights to take any and all response actions  
24 authorized by law; provided, however, the United States shall not  
25 take any actions that constitute implementation of the remedy  
26 selected in the Interim ROD except in accordance with Section VII



1 (Performance of the Interim Remedial Action by Waste Management),  
2 Section XVIII (Emergency Response), and Paragraph 134 of this  
3 Decree; and further provided that such authorities and  
4 reservations by the United States do not impair the covenants as  
5 set forth in this Section.

6 137. Notwithstanding any provision of this Consent  
7 Decree, the United States hereby retains all of its information  
8 gathering and inspection authorities and rights, including  
9 enforcement actions related thereto, under CERCLA, RCRA, and any  
10 other applicable statutes or regulations.

11 XXV. COVENANTS BY WASTE MANAGEMENT AND THE TULALIP TRIBES

12 138. Covenant Not to Sue. Subject only to the specific  
13 reservations set forth in Paragraphs 143 and 144, Waste  
14 Management and the Tulalip Tribes hereby covenant not to sue and  
15 agree not to assert any claims or causes of action against the  
16 United States with respect to the Site or this Consent Decree,  
17 including, but not limited to:

18 a. except as provided in Section XVI (Claims Against  
19 The Superfund) of this Consent Decree, any direct or indirect  
20 claim for reimbursement from the Hazardous Substance Superfund  
21 (established pursuant to the Internal Revenue Code, 26 U.S.C.  
22 § 9507) through Sections 106(b)(2), 107, 111, 112, 113 of CERCLA,  
23 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, 9613, or any other  
24 provision of law;

25 b. any claims against the United States, including any  
26 department, agency, or instrumentality of the United States under



Sections 107 and/or 113 of CERCLA, 42 U.S.C. §§ 9607 and/or 9613, related to the Site, or

c. any claims arising out of response activities at the Site, including claims based on EPA's selection of response actions, oversight of response activities, or approval of plans for such activities. However, notwithstanding the foregoing, if the United States brings a claim or cause of action related to costs associated with the CBRA or the letter referenced in Paragraph 133(b) which is inconsistent with the United States commitments in Paragraph 133(b), Waste Management may assert counterclaims under Paragraph 133(b) to the same extent and for the same matter as that raised in the claim asserted against Waste Management.

139. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d), except as provided in Section XVI (Claims Against The Superfund) of this Consent Decree.

140. In consideration of the Generator Defendants' and the Settling Federal Agencies' covenants not to sue and agreement not to assert any claims or causes of action against Waste Management or their Related Entities and the Tulalip Tribes or their Related Entities with respect to the Site in the Generator Defendants Consent Decree, and except as otherwise provided in Paragraph 144.a., b., c., e., g., and h., Waste Management and the Tulalip Tribes hereby covenant not to sue and agree not to



1 assert any claims or causes of action against the Generator  
2 Defendants or their Related Entities or the Settling Federal  
3 Agencies in the Generator Defendants Consent Decree, with respect  
4 to the Site.

5           141. In consideration of the SDC Defendants' covenants  
6 not to sue and agreement not to assert any claims or causes of  
7 action against Waste Management or its Related Entities and the  
8 Tulalip Tribes or their Related Entities with respect to the Site  
9 in the SDC Defendants Consent Decree, and except as otherwise  
10 provided in Paragraph 144.a., b.(2), e., and h., Waste Management  
11 and the Tulalip Tribes hereby covenant not to sue and agree not  
12 to assert any claims or causes of action against the SDC  
13 Defendants or their Related Entities with respect to the Site.

14           142. Subject only to the specific reservations set  
15 forth in Paragraphs 143, 144, and 148, Waste Management and the  
16 Tulalip Tribes hereby covenant not to sue and agree not to assert  
17 any claims or causes of action, including claims pursuant to  
18 Sections 107 and/or 113 of CERCLA, against any person relating to  
19 liability for Matters Addressed in this Consent Decree.

20           143. Each Settlor reserves, and this Consent Decree is  
21 without prejudice to, claims against the United States, subject  
22 to the provisions of Chapter 171 of Title 28 of the United States  
23 Code, for money damages for injury or loss of property or  
24 personal injury or death caused by the negligent or wrongful act  
25 or omission of any employee of the United States while acting  
26 within the scope of his office or employment under circumstances



1 where the United States, if a private person, would be liable to  
2 the claimant in accordance with the law of the place where the  
3 act or omission occurred. However, any such claim shall not  
4 include a claim for any damages caused, in whole or in part, by  
5 the act or omission of any person, including any contractor, who  
6 is not a federal employee as that term is defined in 28 U.S.C.  
7 § 2671; nor shall any such claim include a claim based on EPA's  
8 selection of response actions, or the oversight or approval of a  
9 Settlor's plans or activities. The foregoing applies only to  
10 claims which are brought pursuant to any statute other than  
11 CERCLA and for which the waiver of sovereign immunity is found in  
12 a statute other than CERCLA.

13 144. Notwithstanding Paragraphs 138, 140, 141, and  
14 142, Waste Management and the Tulalip Tribes reserve, and this  
15 Consent Decree is without prejudice to, the rights of Waste  
16 Management and the Tulalip Tribes:

17 a. to assert claims or defenses that Waste Management  
18 and the Tulalip Tribes may have against any person or entity,  
19 with the exception of the United States on behalf of EPA, who  
20 brings an action against Waste Management or the Tulalip Tribes  
21 seeking to require further response actions, to recover response  
22 costs, or otherwise seeking to impose liability or to recover  
23 response costs for Matters Addressed in this Consent Decree;  
24 provided, however, that such claims shall be limited to the same  
25 scope and may be asserted only to the same extent and for the  
26



1 same matters, transactions, or occurrences as are raised in the  
2 claim asserted against Waste Management or the Tulalip Tribes;

3 b. to assert any claims against any person or entity  
4 other than the United States, and to assert claims against  
5 Settling Federal Agencies pursuant to Sections 107 and/or 113 of  
6 CERCLA, if:

7 (1) EPA institutes judicial proceedings, issues an  
8 order or takes administrative action against Waste  
9 Management or the Tulalip Tribes pursuant to Paragraphs  
10 129, 130, or 133 (other than subparagraphs 133.a., b.,  
11 f., and g.);

12 (2) if a natural resource trustee institutes judicial  
13 proceedings, issues orders or takes administrative  
14 action against Waste Management for natural resource  
15 damages; or

16 (3) EPA institutes judicial proceedings, issues an  
17 order or takes administrative action against the  
18 Tulalip Tribes pursuant to Paragraph 132;

19 provided, however, that such claims listed in subparagraphs b.(1)  
20 through b.(3) of this Paragraph shall be limited to the same  
21 scope and may be asserted only to the same extent and for the  
22 same matters, transactions, or occurrences as are raised in the  
23 claim asserted by the United States against Waste Management or  
24 the Tulalip Tribes. Notwithstanding any other provision of this  
25 Consent Decree, in the event that the claims listed in b.(1)  
26 through b.(3) (other than claims under subparagraphs 133.a., b.,



f., and g. of this Decree) of this Paragraph are asserted against Waste Management or the Tulalip Tribes, Waste Management's or the Tulalip Tribe's reservations and rights against Settling Federal Agencies are limited to those set forth in this subparagraph 144.b. Notwithstanding any other provision of this Consent Decree, Waste Management and the Tulalip Tribes shall not bring a claim or cause of action, including claims pursuant to Sections 107 and/or 113 of CERCLA, against the Seattle School District or the SDC Defendants and their Related Entities in the event the United States brings an action against Waste Management or the Tulalip Tribes pursuant to Paragraphs 129 or 130 (unknown conditions), or against the Seattle School District, SDC Defendants and their Related Entities, Waste Management and its Related Entities, or R.W. Rhine, Inc., in the event that the United States brings an action against the Tulalip Tribes pursuant to Paragraph 132 (off-source), or against SDC Defendants or their Related Entities, the Seattle School District, Waste Management or its Related Entities, or R.W. Rhine, Inc., in the event that the United States requires further response action pursuant to Paragraph 34 of this Consent Decree;

c. to assert any and all claims or causes of action against the other Settlor, the Settling Federal Agencies, and the Generator Defendants relating to costs incurred pursuant to Section XVIII (Emergency Response) of this Decree, except that no such claims or causes of action may be asserted against the Seattle School District or the SDC Defendants or their Related



1 Entities. Notwithstanding any other provision of this Consent  
2 Decree, Waste Management's and the Tulalip Tribes' rights and  
3 reservations against the Settling Federal Agencies relating to  
4 costs incurred pursuant to Section XVIII (Emergency Response) of  
5 this Decree are limited to those set forth in this subparagraph  
6 144.c.

7 d. to assert any and all claims or causes of action  
8 that they may have against insurers;

9 e. to assert any and all claims or causes of action  
10 and to exercise any and all other rights that they may have with  
11 respect to matters beyond those addressed in this Consent Decree;

12 f. to assert any and all claims or causes of action  
13 against any non-settling potentially responsible parties at this  
14 Site, and Generator Defendant Quemetco, Inc., only with respect  
15 to costs incurred or to be incurred by Waste Management pursuant  
16 to the AOC for RI/FS;

17 g. to assert claims or causes of action the Tulalip  
18 Tribes may have against the United States for the United States'  
19 failure to assure performance of reasonable and necessary O&M  
20 activities pursuant to the O&M Work Plan in the event there are  
21 insufficient funds available to perform such O&M activities, as  
22 specified in Paragraph 23 of this Decree; and

23 h. to assert claims or causes of action that the  
24 Tulalip Tribes of Washington may have against any person or  
25 entity other than the United States, and to assert claims or  
26 causes of action against the Settling Federal Agencies pursuant



1 to Sections 107 and/or 113 of CERCLA, for liability for damages  
2 for injury to, destruction of, or loss of natural resources, and  
3 for the costs of any natural resource damage assessments.

4           145. If the United States institutes proceedings,  
5 issues an order, or takes other action pursuant to Paragraphs  
6 129 or 130 for Waste Management or the Tulalip Tribes, or  
7 Paragraph 132 for the Tulalip Tribes only, or if any of the  
8 natural resource trustees bring an action for natural resource  
9 damages, Waste Management and the Tulalip Tribes reserve, and  
10 this Consent Decree is without prejudice to, the rights of Waste  
11 Management or the Tulalip Tribes to contest or defend against the  
12 proceedings, order, or action.

13           146. If the United States takes any response action  
14 pursuant to Paragraph 36 (Failure of the Interim Remedial Action)  
15 for the Tulalip Tribes and Paragraph 37 for Waste Management,  
16 Waste Management and the Tulalip Tribes reserve, and this Consent  
17 Decree is without prejudice to, the rights of Waste Management or  
18 the Tulalip Tribes to contest or defend against any such action,  
19 pursuant to Section XXII (Dispute Resolution) of this Consent  
20 Decree.

21           147. If the United States exercises its information  
22 gathering or inspection authorities or rights, institutes an  
23 enforcement action, or takes other action against Waste  
24 Management or the Tulalip Tribes pursuant to Paragraph 137, Waste  
25 Management and the Tulalip Tribes reserve, and this Consent  
26



1 Decree is without prejudice to, rights of Waste Management or the  
2 Tulalip Tribes to contest or defend against any such action.

3 148. Waste Management hereby reserves its rights to  
4 pursue Browning-Ferris Industries ("BFI") or Browning-Ferris  
5 Industries of Illinois ("BFIIL") for Waste Management's breach of  
6 contract and common law indemnification claims against BFI and/or  
7 BFIIL.

8 XXVI. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

9 149. Nothing in this Consent Decree shall be construed  
10 to create any rights in, or grant any cause of action to, any  
11 person not a Party to this Consent Decree other than Related  
12 Entities which shall be entitled to the protection afforded by  
13 Paragraph 128 of Section XXIV (Covenants Not to Sue by Plaintiff)  
14 and Paragraph 150 of Section XXVI (Effect Of Settlement;  
15 Contribution Protection) of this Decree. The preceding sentence  
16 shall not be construed to waive or nullify any rights that any  
17 person not a signatory to this Decree may have under applicable  
18 law. The Settlers and the United States hereby agree that the  
19 SDC Defendants and their Related Entities, Generator Defendants  
20 and their Related Entities, and the Settling Federal Agencies, as  
21 defined in Section IV (Definitions) of this Decree, are third-  
22 party beneficiaries of the Covenants Not To Sue by the Settlers  
23 in this Decree as specified in Section XXV (Covenants By Waste  
24 Management and The Tulalip Tribes) in this Decree.

25 150. The Parties agree, and by entering this Consent  
26 Decree this Court finds, that Waste Management and its Related



Entities upon the effective date of this Consent Decree, and the Tulalip Tribes and their Related Entities upon the date the Tulalip Tribes pay the \$1,000,000 required by Paragraph 99 of Section XIX (Reimbursement of Response Costs) of this Decree, are entitled to the fullest extent of protection from actions or claims as provided by Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2) and other applicable law, for Matters Addressed in this Consent Decree. However, if a Related Entity of a Settlor initiates any claims or causes of action against the Tulalip Tribes, a PRP, or any other person or entity which if asserted by such Settlor would be inconsistent with the Covenants Not To Sue and the Reservations of Rights by the Settlers in Paragraphs 138, 140, 141, 142, 143, and 144, the contribution protection granted to such Related Entity pursuant to this Consent Decree shall be void. "Matters Addressed" in this Consent Decree shall mean all response actions taken or to be taken and all Response Costs incurred or to be incurred by the United States, the Tulalip Tribes, or any other person or entity with respect to the Site; provided, however, with respect to Waste Management only, Matters Addressed shall not include response actions and Response Costs incurred or to be incurred pursuant to the AOC for RI/FS for which Waste Management has remaining obligations. Such remaining obligations of Waste Management pursuant to the AOC for RI/FS shall not include implementation of remedial action for the Site.

151. Each Settlor agrees that with respect to any suit or claim for contribution brought by it for matters related to



1 this Consent Decree it will notify the United States, in writing,  
2 no later than sixty (60) days prior to the initiation of such  
3 suit or claim.

4           152. In any subsequent administrative or judicial  
5 proceeding initiated by any party with respect to natural  
6 resource damages, payments due under this Decree, or compliance  
7 by Waste Management with the AOC for RI/FS for injunctive relief,  
8 recovery of response costs, or other appropriate relief relating  
9 to the Site, the Parties shall not assert or maintain, any  
10 defense or claim based upon the principles of waiver, res  
11 judicata, collateral estoppel, issue preclusion, claim-splitting,  
12 or other defenses based upon any contention that the claims  
13 raised by the United States in the subsequent proceeding were or  
14 should have been brought in the instant case; provided, however,  
15 that nothing in this paragraph affects the enforceability of the  
16 covenants not to sue set forth in Section XXIV (Covenants Not To  
17 Sue By United States).

18                   XXVII. ACCESS TO INFORMATION

19           153. Each Settlor shall provide to EPA, upon request,  
20 copies of all documents and information within its possession or  
21 control or that of its contractors or agents relating to  
22 activities at the Site or to the implementation of this Consent  
23 Decree, including, but not limited to, sampling, analysis, chain-  
24 of-custody records, manifests, trucking logs, receipts, reports,  
25 sample traffic routing, correspondence, or other documents or  
26 information related to the Work. Each Settlor shall also make



1 available to EPA for purposes of investigation, information  
2 gathering, or testimony, its employees, agents, or  
3 representatives with knowledge of relevant facts concerning the  
4 performance of the Work.

5           154.a. A Settlor may assert business confidentiality  
6 claims covering part or all of the documents or information  
7 submitted to Plaintiff under this Consent Decree to the extent  
8 permitted by and in accordance with Section 104(e)(7) of CERCLA,  
9 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or  
10 information determined to be confidential by EPA will be afforded  
11 the protection specified in 40 C.F.R. Part 2, Subpart B. If no  
12 claim of confidentiality accompanies documents or information  
13 when they are submitted to EPA, or if EPA has notified a Settlor  
14 that the documents or information are not confidential under the  
15 standards of Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7),  
16 the public may be given access to such documents or information  
17 without further notice to that Settlor.

18           b. A Settlor may assert that certain documents,  
19 records, and other information are privileged under the attorney-  
20 client privilege or any other privilege recognized by federal  
21 law. If a Settlor asserts such a privilege in lieu of providing  
22 documents, it shall provide the Plaintiff with the following:  
23 (1) the title of the document, record, or information; (2) the  
24 date of the document, record, or information; (3) the name and  
25 title of the author of the document, record, or information;  
26 (4) the name and title of each addressee and recipient; (5) a



1 description of the contents of the document, record, or  
2 information: and (6) the privilege asserted by that Settlor.  
3 However, no documents, reports, or other information created or  
4 generated pursuant to the requirements of the Consent Decree  
5 shall be withheld on the grounds that they are privileged.

6 155. No claim of confidentiality shall be made with  
7 respect to any data, including, but not limited to, all sampling,  
8 analytical, monitoring, hydrogeologic, scientific, chemical, or  
9 engineering data, or any other documents or information  
10 evidencing conditions at or around the Site.

#### 11 XXVIII. RETENTION OF RECORDS

12 156. Until ten (10) years after Waste Management's  
13 receipt of EPA's notification pursuant to Paragraph 93.b. of  
14 Section XVII (Certification of Completion), Waste Management  
15 shall preserve and retain all records and documents now in its  
16 possession or control or which come into its possession or  
17 control that relate in any manner to the performance of the Work  
18 or relate in any manner to the liability of any person for  
19 response actions conducted and to be conducted at the Site,  
20 regardless of any corporate retention policy to the contrary.  
21 Until ten (10) years after Waste Management's receipt of EPA's  
22 notification pursuant to Paragraph 93.b. of Section XVII  
23 (Certification of Completion), Waste Management shall also  
24 instruct its contractors and agents to preserve all documents,  
25 records, and information of whatever kind, nature, or description  
26 relating to the performance of the Work.



1           157. Until ten (10) years after Waste Management's  
2 receipt of EPA's notification pursuant to Paragraph 93.b. of  
3 Section XVII (Certification of Completion), the Tulalip Tribes  
4 shall preserve and retain all records and documents now in its  
5 possession or control or which come into its possession or  
6 control that relate in any manner to the performance of the Work  
7 or relate in any manner to the liability of any person for  
8 response actions conducted and to be conducted at the Site,  
9 regardless of any tribal record retention policy to the contrary.  
10 Until ten (10) years after Waste Management's receipt of EPA's  
11 notification pursuant to Paragraph 93.b. of Section XVII  
12 (Certification of Completion), the Tulalip Tribes shall also  
13 instruct its contractors and agents to preserve all documents,  
14 records, and information of whatever kind, nature, or description  
15 relating to the performance of the Work.

16           158. At the conclusion of the time periods specified  
17 in Paragraphs 156 and 157 above, Waste Management and the Tulalip  
18 Tribes, as applicable, shall notify the United States at least  
19 ninety (90) days prior to the destruction of any such records or  
20 documents, and, upon request by the United States, Waste  
21 Management and the Tulalip Tribes, as applicable, shall deliver  
22 any such records or documents to EPA. Each Settlor may assert  
23 that certain documents, records, and other information are  
24 privileged under the attorney-client privilege or any other  
25 privilege recognized by federal law. If a Settlor asserts such a  
26 privilege, it shall provide the Plaintiffs with the following:



1 (1) the title of the document, record, or information; (2) the  
2 date of the document, record, or information; (3) the name and  
3 title of the author of the document, record, or information;  
4 (4) the name and title of each addressee and recipient; (5) a  
5 description of the subject of the document, record, or  
6 information; and (6) the privilege asserted by that Settlor.  
7 However, no documents, reports, or other information created or  
8 generated pursuant to the requirements of the Consent Decree  
9 shall be withheld on the grounds that they are privileged.

10 159. Each Settlor hereby certifies individually that,  
11 to the best of its knowledge and belief, after thorough inquiry,  
12 that since the date EPA issued a general notice letter to Waste  
13 Management, it has not knowingly altered, mutilated, discarded,  
14 destroyed, or otherwise disposed of any records, documents, or  
15 other information relating to its potential liability regarding  
16 the Site which are the sole record of factual information, except  
17 for the one specific instance where Waste Management has informed  
18 EPA that Waste Management had destroyed or altered such documents  
19 in the ordinary course of Waste Management's business in  
20 compliance with state and federal law and were not destroyed for  
21 an improper purpose. Each Settlor warrants that it has fully  
22 complied with any and all EPA requests for information pursuant  
23 to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and  
24 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.



1                               XXIX. NOTICES AND SUBMISSIONS

2                   160. Whenever, under the terms of this Consent Decree,  
3 written notice is required to be given or a report or other  
4 document is required to be sent by one Party to another, it shall  
5 be directed to the individuals at the addresses specified below,  
6 unless those individuals or their successors give notice of a  
7 change to the other Parties, in writing. All notices and  
8 submissions shall be considered effective upon receipt, unless  
9 otherwise provided. Written notice as specified herein shall  
10 constitute complete satisfaction of any written notice  
11 requirement of the Consent Decree with respect to the  
12 United States, EPA, and Waste Management and the Tulalip Tribes,  
13 respectively.

14 As to the United States:

15 Chief, Environmental Enforcement Section  
16 Environment and Natural Resources Division  
17 U.S. Department of Justice  
18 P.O. Box 7611, Ben Franklin Station  
19 Washington, D.C. 20044  
20 Re: DOJ # 90-11-3-1412

21 As to EPA:

22 Loren McPhillips  
23 EPA Project Manager  
24 United States Environmental Protection Agency  
25 Region 10  
26 1200 Sixth Avenue  
27 Seattle, WA 98101

28 As to Waste Management:

Steve Richtel  
Waste Management, Inc.  
3900 South Wadsworth Boulevard, Suite 800  
Lakewood, CO 80235



1 As to The Tulalip Tribes:

2 Tom "Mac" McKinsey  
3 Superfund Coordinator  
4 The Tulalip Tribes of Washington  
5 6700 Totem Beach Road  
6 Marysville, WA 98271.

7 XXX. EFFECTIVE DATE

8 161. The effective date of this Consent Decree shall  
9 be the date upon which this Consent Decree is entered by the  
10 Court, except as otherwise provided herein.

11 XXXI. RETENTION OF JURISDICTION

12 162. This Court retains jurisdiction over both the  
13 subject matter of this Consent Decree and Waste Management and  
14 the Tulalip Tribes for the duration of the performance of the  
15 terms and provisions of this Consent Decree for the purpose of  
16 enabling any of the Parties to apply to the Court at any time for  
17 such further order, direction, and relief as may be necessary or  
18 appropriate for the construction or modification of this Consent  
19 Decree, or to effectuate or enforce compliance with its terms, or  
20 to resolve disputes in accordance with Section XXII (Dispute  
21 Resolution) hereof, consistent with Paragraph 1.a.

22 XXXII. APPENDICES

23 163. The following appendices are attached to and  
24 incorporated into this Consent Decree:

25 "Appendix A" is the Interim ROD;

26 "Appendix B" is the SOW;

27 "Appendix C" is the description and/or map of the Site;



1 "Appendix D" is the list of Settling Federal Agencies;  
2 "Appendix E" is the list of mixed funding application  
3 procedures;  
4 "Appendix F" is the AOC between Waste Management and EPA;  
5 and  
6 "Appendix G" is the Generator Defendants Consent Decree and  
7 the SDC Defendants Consent Decree.

8 XXXIII. COMMUNITY RELATIONS

9 164. Each Settlor shall propose to EPA its  
10 participation in the community relations plan to be developed by  
11 EPA. EPA will determine the appropriate role for each Settlor  
12 under the Plan. Each Settlor shall also cooperate with EPA in  
13 providing information regarding the Work to the public. As  
14 requested by EPA, a Settlor shall participate in the preparation  
15 of such information for dissemination to the public and in public  
16 meetings which may be held or sponsored by EPA to explain  
17 activities at or relating to the Site.

18 XXXIV. MODIFICATION

19 165. Schedules specified in this Consent Decree for  
20 completion of the Work may be modified by agreement of EPA and a  
21 Settlor. All such modifications shall be made in writing.

22 166. Except as provided in Paragraph 21 ("Modification  
23 of the SOW or Related Work Plans"), no material modifications  
24 shall be made to the SOW without written notification to and  
25 written approval of the United States, the affected Settlor, and  
26 the Court. Modifications to the SOW that do not materially alter



1 that document may be made by written agreement between EPA and  
2 that Settlor.

3 167. Nothing in this Decree shall be deemed to alter  
4 the Court's power to enforce, supervise, or approve modifications  
5 to this Consent Decree.

6 XXXV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

7 168. This Consent Decree shall be lodged with the  
8 Court for a period of not less than thirty (30) days for public  
9 notice and comment in accordance with Section 122(d)(2) of  
10 CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United  
11 States reserves the right to withdraw or withhold its consent if  
12 the comments regarding the Consent Decree disclose facts or  
13 considerations which indicate that the Consent Decree is  
14 inappropriate, improper, or inadequate. Each Settlor consents to  
15 the entry of this Consent Decree, and waives any right to respond  
16 to a motion to enter this Consent Decree by the United States.

17 169. If for any reason the Court should decline to  
18 approve this Consent Decree in the form presented, this agreement  
19 is voidable as to a Settlor by written notice by that Settlor to  
20 the other PRPs, or as to Plaintiff by written notice to the  
21 Parties, and the terms of the agreement may not be used as  
22 evidence in any litigation between any of the remaining Parties  
23 to this Consent Decree and the Settlor as to whom this Consent  
24 Decree is void.



1 XXXVI. SIGNATORIES/SERVICE

2 170. Each undersigned representative of a Settlor to  
3 this Consent Decree and the Assistant Attorney General for  
4 Environment and Natural Resources of the United States Department  
5 of Justice certifies that he or she is fully authorized to enter  
6 into the terms and conditions of this Consent Decree and to  
7 execute and legally bind such Party to this document.

8 171. Each Settlor consents to the entry and hereby  
9 agrees not to oppose entry by this Court or to challenge any  
10 provision of this Consent Decree or of the contemporaneous  
11 Generator Defendants Consent Decree or the SDC Defendants Consent  
12 Decree, which are lodged with the Court by the United States and  
13 provided that it contains substantially equivalent covenants not  
14 to sue extending to the Settlers and their Related Entities,  
15 unless the United States has notified the Settlers, in writing,  
16 that it no longer supports entry of this Consent Decree.

17 172. Each Settlor shall identify, on the attached  
18 signature page, the name, address, and telephone number of an  
19 agent who is authorized to accept service of process by mail on  
20 behalf of that Party with respect to all matters arising under or  
21 relating to this Consent Decree. Each Settlor hereby agrees to  
22 accept service in that manner and to waive the formal service  
23 requirements set forth in Rule 4 of the Federal Rules of Civil  
24 Procedure and any applicable local rules of this Court,  
25 including, but not limited to, service of a summons.



SO ORDERED THIS 18<sup>th</sup> DAY OF March, 1998

Thomas S. Rof  
United States District Judge



1 THE UNDERSIGNED PARTIES enter into this Consent Decree in the  
2 matter of United States v. Seattle Disposal Company, et al.,  
relating to the Tulalip Landfill Superfund Site.

4 FOR THE UNITED STATES OF AMERICA

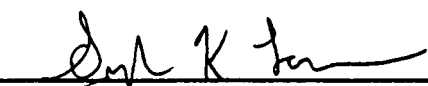
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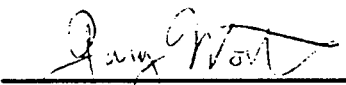
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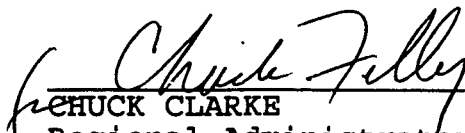


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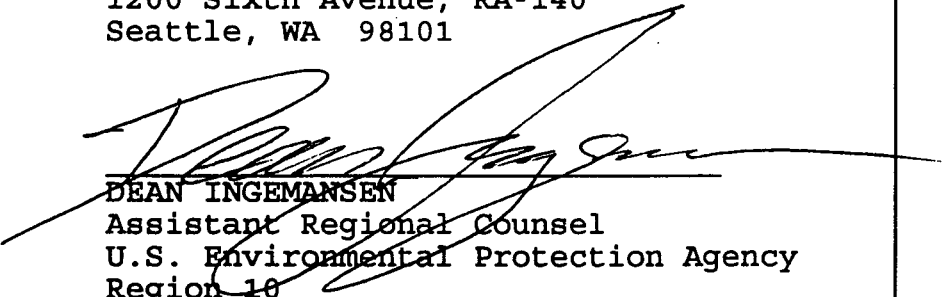
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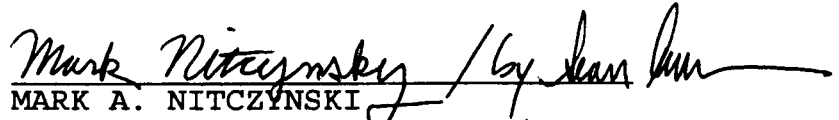
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1 THE UNDERSIGNED PARTIES enter into this Consent Decree on behalf of  
2 the Bureau of Indian Affairs, United States Department of the  
3 Interior, for purposes of access only, in accordance with Paragraph  
4 I.C. of this Decree.

5 FOR THE UNITED STATES OF AMERICA

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1  
2 THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of  
3 United States v. Seattle Disposal Company, et al., relating to the  
4 Tulalip Landfill Superfund Site.

5 FOR WASHINGTON WASTE HAULING & RECYCLING,  
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7 Date:

July 19, 1997

  
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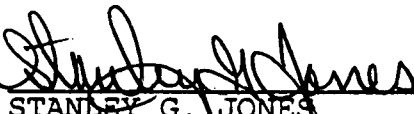
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1  
2 THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of  
3 United States v. Seattle Disposal Company, et al., relating to the  
4 Tulalip Landfill Superfund Site.

5  
6 FOR THE TULALIP TRIBES OF WASHINGTON

7  
8 Date: 7-19-1997

  
STANLEY G. JONES

Chairman

The Tulalip Tribes of Washington  
6700 Totem Beach Road  
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3 THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of  
4 United States v. Seattle Disposal Company, et al., relating to the  
5 Tulalip Landfill Superfund Site.

6 FOR THE TULALIP SECTION 17 CORPORATION

7 Date: 7-19-1997

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STANLEY G. JONES

9 Chairman *Section 17 Corporation*  
10 The Tulalip Tribes of Washington  
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## APPENDIX A



**RECORD OF DECISION**

**TULALIP LANDFILL SUPERFUND SITE  
INTERIM REMEDIAL ACTION  
MARYSVILLE, WASHINGTON**

**March 1996**

**U.S. Environmental Protection Agency  
Region 10**



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## **DECLARATION FOR THE RECORD OF DECISION**

### **Site Name and Location**

Tulalip Landfill Superfund Site  
Marysville, Washington

### **Statement of Basis and Purpose**

This decision document presents the selected interim remedial action for the Tulalip Landfill near Marysville, Washington, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this interim action. The landfill is located within the boundary of the Tulalip Indian Reservation. The Tulalip Tribes of Washington concur with the selected remedy.

### **Assessment of the Site**

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent or substantial endangerment to public health, welfare, or the environment.

### **Description of the Selected Remedy**

The interim remedy documented by this interim ROD is designed to protect public health and the environment by containing and preventing contact with the landfill wastes. Major elements of the selected remedy include:

- capping the landfill in accordance with the Washington State Minimum Functional Standards (MFS) for landfill closure
- installing a landfill gas collection system. If necessary, a gas treatment system will also be installed
- monitoring the leachate mound within the landfill, the perimeter leachate seeps, and landfill gas to ensure the selected remedy is adequately containing the landfill wastes
- restrictions to protect the landfill cap
- providing for operation and maintenance (O&M) to ensure the integrity of the cap system



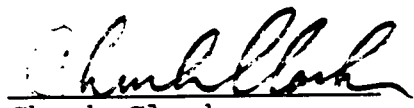
The selected remedy is expected to stem the migration of contaminants from the landfill into the surrounding estuary by minimizing the amount of rain water infiltrating the wastes, thereby minimizing the generation of new leachate.

The selected interim remedy is expected to allow productive use of the landfill surface, with restrictions to prevent damage to the cover system. The interim remedy shall be designed and constructed to be compatible with the types of future use activities described in the Big Flats Land Use Program, Tulalip Landfill Remedial Investigation and Feasibility Study (July 10, 1994). When design and construction of the interim remedy are complete, EPA and the Tulalip Tribes shall develop a document titled "Routine Use of Tulalip ('Big Flats') Landfill," the purpose of which shall be to ensure the continued integrity of the cover system.

#### **Statutory Determinations**

The selected interim remedial action is protective of human health and the environment, complies with Federal, State, and Tribal requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This interim remedial action utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. The presumptive remedy approach for municipal landfills utilizes the remedial approach of containment of wastes rather than treatment of wastes. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element may be addressed by the final response action.

Because the interim remedial action will result in hazardous substances remaining on-site above health-based levels, a review will be conducted no less often than every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Because this is an interim action ROD, review of this site and this interim remedy will be ongoing as EPA continues to develop final remedial alternatives for the wetlands surrounding the landfill.

  
Chuck Clarke  
Regional Administrator  
U.S. EPA Region 10

3/1/96  
Date



## LIST OF ACRONYMS

AAL	Acceptable Ambient Levels
AET	Apparent Effects Threshold
AMBS	Area of Major Biological Significance
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BIA	Bureau of Indian Affairs
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQA	Construction Quality Assurance
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DOD	Department of Defense
EPA	Environmental Protection Agency
FML	Flexible Membrane Liner
FS	Feasibility Study
FWPCA	Federal Water Pollution Control Act
FWQC	Federal Water Quality Criteria
gm	gram
HEAST	Health Effects Assessment Summary Tables
IRIS	Integrated Risk Information System
MCC	Marine Chronic Criteria



MFS	Minimum Functional Standards
MOA	Memorandum of Agreement
MSL	Mean Sea Level
MTCA	(Washington) Model Toxics Control Act
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTR	National Toxics Rule
OSWER	(EPA) Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Works
ppm	parts per million
PQL	Practical Quantitation Limit
PRP	Potentially Responsible Party
PSAPCA	Puget Sound Air Pollution Control Authority
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SACM	Superfund Accelerated Cleanup Model
SARA	Superfund Amendments and Reauthorization Act
SDC	Seattle Disposal Company



SMA	Shoreline Management Act
SP	Seep
TBC	To Be Considered
USCS	Unified Soil Classification System
WAC	Washington Administrative Code



## 1.0 SITE DESCRIPTION

### 1.1 PHYSICAL SETTING

The Tulalip Landfill occupies approximately 147 acres and is located on a low-lying island (commonly referred to as North Ebey Island) in the Snohomish River delta. This island is within the floodplain of the Snohomish River. Located within the bounds of the Tulalip Indian Reservation, the landfill lies generally between Marysville and Everett, Washington (see Figure 1-1). North Ebey Island is bounded to the north by Ebey Slough and to the south by Steamboat Slough. The island is located in Snohomish County, Township 30N, Range 5E, Section 32.

Prior to landfilling activities, the land on which the landfill is located consisted of relatively undisturbed intertidal wetlands, and reached heights of about 3 to 6 feet above mean sea level (MSL). Today, the landfill reaches heights of about 12 to 20 feet above MSL. The landfill is bounded by a perimeter berm that is approximately 15 feet high. During landfilling operations, barge canals were cut into the island to allow water barges bearing refuse to transport waste into the landfill. Initially, waste was removed from the barges and placed directly on top of adjacent wetlands. During later operations, wetlands adjacent to the canals were dredged prior to placing the waste into the dredged areas. In general, these barge canals were deeper than other parts of the landfill. The former barge canals, which are now filled with waste, and other physical features of the Tulalip Landfill area are shown in Figure 1-2. The average depth of fill throughout most of the landfill is about 17 feet; in the old barge canals the fill depth reaches about 30 feet. Three to four million tons of mixed commercial and industrial waste were deposited in the landfill during its period of operation from 1964 to 1979. The waste is covered with silt, silty sand, clay and medium sand, and demolition and construction debris at depths up to 11 feet.

The results of Remedial Investigation (RI) indicate that there is a mound of contaminated ground water (landfill "leachate") within the landfill waste. This leachate mound is fed by precipitation, and its height varies between approximately 10-16 feet above MSL. Because the mound is considerably higher than the mean sea level and the ground water level surrounding the landfill, the weight of this leachate mound drives landfill contaminants out and away from the landfill. Some of the leachate (between approximately 5-35%) is pushed out the outer edge of the perimeter berm and flows onto wetlands and into tidal channels surrounding the landfill. Most of the leachate seeps occur on the outside of the landfill berm, but one seep that was sampled during the RI (SP-01) originates on the landfill surface. The remainder of the leachate (approximately 65-95%) is driven downward by the weight of the leachate mound into ground water



beneath the landfill, where it migrates outward and is discharged to waterways surrounding the landfill.

The leachate mound is primarily freshwater. The mound is maintained mainly by precipitation, which falls in significant quantities in the Puget Sound region. The landfill vicinity typically receives between 35 and 40 inches of rain per year, and experiences a rainy season (October to March) and a dry season (April to September). In general, the leachate mound rises during the rainy season, which is accompanied by visibly greater amounts of leachate discharging through the perimeter seeps. During the dry season the height of the mound falls, and the amount of leachate discharging through the seeps decreases to levels where some of the seeps cease to flow.

Commercial harvests of invertebrates and demersal and anadromous fish occur in the immediate vicinity of the landfill each year. The adjacent river system supports commercial and sport fisheries. Important commercial species in the vicinity of the Site include pink, chum, coho, and chinook salmon; steelhead and cutthroat trout; American shad, English sole, and Dungeness crab. Site access is currently restricted, and the wetlands adjacent to the west of the Site remain relatively undisturbed by human activity. Additional wetlands lie immediately north of Ebey Slough. People live north of Ebey Slough. The nearest residence is located approximately 600 feet away from the landfill perimeter.<sup>1</sup> Smith Island is located south of Steamboat Slough.

Ground water beneath the Site is brackish and therefore unusable as a potable water source. Site studies indicate that contaminated ground water from the landfill migrates to the wetlands and sloughs surrounding the Site and does not pose a threat to ground water drinking water sources located across the sloughs.

## 1.2 ECOLOGICAL SETTING

The areas surrounding the landfill have significant aesthetic, environmental, economic, and recreational value. The landfill is located within the Puget Sound Estuary, one of 28 estuaries in the country that has been targeted for protection and restoration under the National Estuary Program, which was established by Congress in 1987 as part of the Clean Water Act. The State of Washington has classified the surface waters surrounding the Site as "Class A" waters of the State, which are characterized as generally "excellent" waters, where water quality meets or exceeds the requirements for all, or

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<sup>1</sup> Personal communication, Eric Winiecki, EPA, and Tom McKinsey, Tulalip Tribes, February 8, 1996.



substantially all, designated uses.<sup>2</sup> The tidal mudflats and marsh habitats surrounding the landfill are natural resources that provide spawning and foraging areas for wildlife species. The Snohomish River delta is designated as a Washington Shoreline of Statewide Significance by the Washington State Department of Ecology, and designated as an Area of Major Biological Significance (AMBS) for American shad and English sole by the U.S. Fish and Wildlife Service.

The landfill is surrounded on all sides by environmentally sensitive wetlands, including an area of approximately 160 acres of salt marsh and mudflats located immediately west of the landfill. These wetlands have an important environmental role in the Snohomish River delta as sources and sinks for nutrients, sediment retention areas, and habitat transition zones. Wetlands serve as unique ecosystems that support highly diverse and abundant wildlife species. Plant species in the area, such as cattail, bulrush, and sedge, provide shelter, feeding, and nesting areas for wildlife. These plants serve as a food source for waterfowl and other aquatic animals.

The Snohomish River supports a diverse aquatic community. One of the most important functions of estuarine wetlands is that they provide nursery areas for many fish and wildlife species. The tidal mudflats and emergent marsh habitat in the vicinity of the Tulalip Landfill serve as spawning, nursery and feeding habitats for a diverse population of demersal fish and invertebrates.

Species that live in the estuarine wetlands around the Tulalip Landfill include shorebirds and waterfowl, marsh hawk, coyote, otter, and deer. Aquatic species residing in the Tulalip Landfill area include salmon, cutthroat trout, clams, mussels, shrimp, and juvenile Dungeness crab. Species of concern under the federal Endangered Species Act or comparable Washington State regulations that have been observed in the vicinity of the Site, or that may be expected to use habitat areas near the Site, are listed in Table 1-1. The bald eagle and the stellar (northern) sea lion are considered threatened under State and Federal law. A plant, the choriño bog orchid, has State status as a threatened species.

The Tulalip Landfill is situated within this ecologically valuable ecosystem. Contaminated leachate from the landfill discharges directly into wetlands that carry on critical habitat functions. Over the years, human activities have increasingly led to the destruction and degradation of such wetland areas within the Snohomish River delta. As such wetland resources

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<sup>2</sup> Chapter 173-201 Washington Administrative Code (WAC), Water Quality Standards for Surface Waters of the State of Washington, January 6, 1988.



become more scarce, the importance of protecting and preserving the remaining areas for future generations becomes crucial. The results of the streamlined baseline Risk Assessment for Interim Remedial Action (the "Streamlined Risk Assessment") indicate that the landfill acts as a chronic source of contamination to the surrounding environment, and that ongoing chemical discharges from the Tulalip Landfill are resulting in potentially harmful effects to animals living on and around the landfill.

## **2.0 SITE HISTORY AND ENFORCEMENT ACTIONS**

### **The Tulalip Tribes of Washington**

The Tulalip Tribes of Washington (the Tribes) is a federally recognized Indian Tribe Organized under Section 16 of the Indian Reorganization Act of 1934, as amended, 25 U.S.C. § 476. The lands on which the landfill is located are currently held by the United States in trust. The landfill is located on two property parcels, one of which generally includes the eastern half of the landfill, and the other includes the western half. The Tribes established the Tulalip Section 17 Corporation, a federal corporation chartered pursuant to Section 17 of the Indian Reorganization Act, 25 U.S.C. § 477, which is the trust beneficiary of the westerly parcel that was accepted into trust by the United States in 1960. The Tulalip Tribes is the trust beneficiary of the easterly parcel, accepted into trust in 1971.

To assist the Tribes' involvement in the Superfund process, the Region entered into a Memorandum of Agreement (MOA) with the Tribes on February 11, 1992. The MOA was amended on September 9, 1992, to include the Bureau of Indian Affairs as a signatory. The Region also granted the Tribes a Superfund support agency cooperative agreement under Section 104 of CERCLA, which provides funds to support the Tribes' Superfund coordinator.

### **Operation of the Landfill 1964-1979**

In 1964, the Tulalip Section 17 Corporation, as authorized by a resolution of the Tribes, leased the landfill Site to the Seattle Disposal Company (SDC) for a 10 year period. A second lease was executed in 1972. From 1964 to 1979, SDC operated the landfill under the direction of its general partners, Josie Razore, John Banchemo, and Alphonso Morelli. Known then as "Big Flats Landfill", the Site handled commercial and industrial waste. The leases between the Tulalip Section 17 Corporation and Seattle Disposal allowed specified waste disposal and related activities for a "sanitary land fill operation" and required a "final cleanup" of the Site. For the most part, the landfill did not accept putrescible wastes, although the Tribes were allowed to dispose of garbage. It was never intended that the landfill accept putrescible waste or function in the capacity of a municipal landfill. Between 1964 and 1979, it is reported that



approximately three to four million tons of mixed commercial and industrial waste was deposited in the landfill.

Because of ongoing environmental problems associated with the landfill operations, EPA filed a complaint in 1977 to permanently stop the use of the landfill for disposal of waste. In 1979 the landfill was closed and covered pursuant to the Rivers and Harbors Act of 1899, 33 U.S.C. §§ 403 and 407, and the Federal Water Pollution Control Act, 33 U.S.C. §§1311, 1319, 1341, and 1344, in accordance with a consent decree entered in U.S. District Court for the Western District of Washington on October 19, 1977, and amended on May 12, 1978. The closure, fully funded by SDC, required the construction of a perimeter berm around the landfill waste disposal area, and placement of cover soils after final grading of the surface. Recent Site studies indicate the waste is covered with approximately 12 inches to 11 feet of soil. However, the landfill surface was left relatively flat, which subsequently resulted in poor drainage and ponding of water on the landfill surface.

#### **Operations at the Landfill after 1985**

In 1985, the Tulalip Tribes of Washington sought to place a thicker soil cap over the landfill to address ongoing leachate discharges at the Site. At the time, the Tribes hoped to obtain surface grade materials from construction of a tunnel for Interstate 90 leading into Seattle.

In order to perform the work, the Tribes applied to the Army Corps of Engineers in March 1985 for a dredge and fill permit pursuant to the Clean Water Act, 33 U.S. C. § 1342, to build a dock for delivery of materials to the landfill. The Corps granted the permit a year later, in March 1986.

In 1985, the Tribes also applied to EPA for a National Pollutant Discharge Elimination System ("NPDES") Permit for placement of material on the landfill surface. The Corps had decided to not include the placement of additional fill in a CWA 404 permit, writing to Tribes that the proposed capping project was properly authorized pursuant to Section 402 of the Clean Water Act under an NPDES permit. The Corps based its reasoning on the fact that the Corps characterized the Tribes' efforts to install a more effective cover over the Tulalip Landfill wastes as "an essential feature of the landfill/wasting operation" at the Site which the Corps believed was subject to Section 402 of the CWA. EPA issued a five year NPDES permit in February of 1986, which allowed the placement of low permeability soils as approved by EPA, and required the collection of leachate. The permit was amended in March 1987 to allow for the placement of approved materials from other projects, when the Tribe did not obtain soils from the I-90 tunnel.



From late 1986 to 1990, the Tulalip Section 17 Corporation, in a joint venture with SEBB Corporation,<sup>3</sup> contracted with R.W. Rhine for the placement of capping materials. R.W. Rhine brought materials from several demolition projects, including approximately 200,000 cubic yards of debris generated by the demolition of structures from the U.S. Navy's construction of a new "home port" in Everett, Washington. Rhine used the materials brought to the Site to build a road network for "cells" to be filled in during the capping project. An information request response from R.W. Rhine lists the sources of additional capping materials and demolition wastes that were deposited at the landfill.

In 1990, EPA corresponded with the Tribes regarding the disposal of materials without EPA approval. EPA's letter recommended that the Tribes cease the voluntary capping effort, and comply with the NPDES permit requirement to collect leachate. In 1991, the Tribes wrote EPA that they would not apply to renew the NPDES permit.

#### **The National Priorities List (NPL)**

In February and March 1988, EPA contractor Ecology & Environment, Inc. (E&E) performed a Site Inspection of the landfill for NPL evaluation. The inspection revealed groundwater contamination with unacceptably high levels of arsenic, barium, cadmium, chromium, lead, mercury, and silver. Water samples taken in the wetlands adjacent to the Site showed exceedences of marine chronic criteria for cadmium, chromium, and lead as well as exceedences in marine acute criteria for copper, nickel and zinc. In addition, a variety of metals were found in on-site pools and leachate. The study concluded that contamination was migrating off-site.

On July 29, 1991, EPA proposed adding the Tulalip Landfill to the National Priorities List (NPL). Although the public comment period on the proposed NPL listing closed in October 1991, SDC made 11 submissions of comments between May 1993 and February 1995. On April 25, 1995, with the support of the Governor of the State of Washington, EPA published the final rule adding the Site to the NPL. In July 1995, SDC and the University of Washington filed petitions to challenge the NPL rule in the U.S. Court of Appeals for the District of Columbia. This litigation is ongoing.

#### **The Remedial Investigation and Feasibility Study**

In August 1993, EPA signed an Administrative Order on Consent with several Potentially Responsible Parties (the

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<sup>3</sup> SEBB Corporation no longer exists.



Respondents)<sup>4</sup> to conduct a Remedial Investigation and Feasibility Study (RI/FS). These parties include Seattle Disposal Company, Marine Disposal, Josie Razore, John Banchemo, Washington Waste Hauling and Recycling, Inc., Rubatino Refuse Removal, Inc., Monsanto Company, and the Port of Seattle.

Site investigation efforts, including sampling done recently by the Respondents as part of the Remedial Investigation (RI), show that landfill leachate leaving the Site exceeds water quality criteria and standards for pesticides such as DDT, heptachlor, and aldrin, polychlorinated biphenyls (commonly known as PCBs), and heavy metals and other contaminants including chromium, copper, lead, mercury, nickel, zinc, and ammonia. This leachate flows directly into sensitive, ecologically valuable wetlands that surround the Site, and into sloughs connected with the Snohomish River and Puget Sound. The RI documents the presence of hazardous substances in the soils, sediments, surface water, and ground water at the Site.

#### **Citizen Suit under Clean Water Act and Resource Conservation and Recovery Act (RCRA)**

On March 30, 1994, Josie Razore and John Banchemo filed suit against the Tulalip Tribes, the Tulalip Section 17 Corporation, The Bureau of Indian Affairs (BIA) and Carol Browner, Administrator of the Environmental Protection Agency (EPA). The complaint alleged that the defendants Tulalip Tribes, Tulalip Section 17 Corporation, and BIA were in violation of their NPDES permit and Section 301(a) of the Clean Water Act. The complaint was amended to add counts under the citizen suit provision of the Resource Conservation and Recovery Act (RCRA). In addition, the complaint alleged that EPA has a mandatory duty to enforce the NPDES permit and provisions of the CWA and RCRA.

The plaintiffs requested that the court enjoin further violations of the CWA and RCRA, issue an injunction ordering the defendants to stop the discharge of leachate without a permit, and assess penalties for violation of the CWA and RCRA.

On September 23, 1994, the court dismissed the lawsuit, holding that the court was deprived of jurisdiction pursuant to CERCLA Section 113(h). The court found that the plaintiffs remedy was "clearly" a "challenge" in its attempt to dictate specific remedial actions at a Superfund Site and alter the method and order for cleanup during an RI/FS and prior to a determination of the ultimate remedial plan. The Plaintiffs appealed the dismissal to the U.S. Court of Appeals for the Ninth Circuit. The plaintiffs subsequently filed with the court an

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<sup>4</sup> For the purposes of this interim ROD, "Respondents" refers to some or all of the PRPs that signed the RI/FS AOC.



Appellants Memorandum of Emergency Motion for Injunction Pending Appeal, which cited testimony from their expert (Ellingsworth) that leachate is discharging from the Tulalip Landfill Site at levels exceeding water quality criteria so that water quality will "fall below the level that will sustain fish and other aquatic life in the waters surrounding the landfill." The plaintiffs' emergency motion was denied by the court. On September 19, 1995, the U.S. Court of Appeals for the Ninth Circuit filed an opinion upholding dismissal of the lawsuit.

#### **Invocation of Dispute Resolution Under the 1993 AOC**

On February 17, 1995, the Respondents to the 1993 AOC for the conduct of the RI/FS invoked dispute resolution under Paragraph 61 of the AOC with respect to a number of issues including:

- (1) EPA's denial of Respondents' request to modify the RI/FS Work Plan to allow for the performance of additional work under the AOC;
- (2) the elimination of two remedial action alternatives during the screening process;<sup>5</sup>
- (3) the exclusion of institutional controls as a stand-alone remedy;
- (4) brackish water AWQC evaluations;
- (5) dissolved metals data in the evaluation of alternatives and their compliance with ARARs; and
- (6) mixing zones for measuring compliance with AWQCs.

On October 18, 1995, EPA Region 10's Deputy Regional Administrator issued a final determination on the issues stated above:

- (1) EPA denied the request to modify the Work Plan because the request was untimely, would delay cleanup, was inconsistent with the RI, was structurally flawed, and was not needed to support the Source Area Containment Feasibility Study (FS);
- (2) EPA determined that the two disputed alternatives were appropriately eliminated during the screening process and should not be included in the FS, because they did not comply with CERCLA, the NCP, and EPA guidance;

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<sup>5</sup> Detailed discussion of these two alternatives is provided in Section 8.12 - Other Alternatives.



(3) EPA determined that institutional controls, as a stand-alone remedy, was appropriately excluded from the FS during the screening process;

(4) EPA determined that the use of brackish water AWQC evaluations in the SAC-4 report was inappropriate and inconsistent with State law, CERCLA, and the NCP;

(5) EPA determined that the use of limited dissolved metal data did not prejudice RI/FS data collection and evaluation efforts; and

(6) EPA determined that mixing zones would not be used for measuring compliance with AWQC.

### 3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

CERCLA requirements for public participation include releasing the Remedial Investigation and Feasibility Study (RI/FS) Reports and the Proposed Plan to the public and providing a public comment period on the Feasibility Study and Proposed Plan. EPA met these requirements by placing both documents in the public information repositories for the Site prior to the start of the public comment period. EPA mailed copies of a fact sheet summarizing the Proposed Plan on August 4, 1995 to individuals on the mailing list. The fact sheet explained how interested parties could get copies of the entire Proposed Plan. Extra copies of the Proposed Plan were also made available at the Marysville Public Library. EPA published a notice of the release of the RI/FS and Proposed Plan in the Everett Herald on August 4, 1995, and the weekly Marysville Globe on August 9, 1995. Notice of the 30 day public comment period and the public meeting discussing the proposed plan were included in the newspaper notice. Prior to issuance of the Proposed Plan, the PRPs requested a 30 day public comment period extension, which EPA granted. A public meeting was held on August 22, 1995, at the Snohomish County Public Utility District Auditorium in Everett, Washington. The PRPs requested an additional public comment period extension, which EPA granted by extending the comment period to October 25, 1995, for a total comment period of 80 days. At the request of one of the Potentially Responsible Parties, a second public meeting was held on October 3 in Seattle. Written public comments received during the comment period, and transcripts of the public meetings, are included in the Administrative Record.

To date, the following Superfund community relations activities have been conducted by EPA at the Tulalip Landfill Site:



December 1987	EPA released a fact sheet announcing a sampling effort.
September 1988	EPA released a fact sheet summarizing the findings of the Site Investigation.
July 1991	EPA released a fact sheet announcing the proposal of the Tulalip Site to the National Priorities List.
September 1993	EPA released a fact sheet which explained the Superfund process and announced plans to talk to citizens about concerns related to the Tulalip Site.
November 1993	EPA released the Community Relations Plan.
November 1993	A fact sheet is released announcing the beginning of the remedial investigation.
January 25, 1995	EPA mailed an update of the activities at the Site, which included a general description of the presumptive remedy containment approach and its application to the Tulalip Site.
August 4, 1995	EPA mailed a fact sheet summarizing the Proposed Plan for interim cleanup.
August 4, 1995	EPA released the Proposed Plan.
August 4, 1995	Newspaper Ad ran in the <u>Everett Herald</u> announcing the public comment period and the date and time of the public meeting.
August 9, 1995	Same newspaper ad from August 4, 1995, ran in the <u>Marysville Globe</u> .
August 14, 1995	EPA received a request from one of the Potentially Responsible Parties to extend the public comment period. EPA ran a newspaper ad in the <u>Everett Herald</u> announcing the extension to the public comment period.
August 22, 1995	Public meeting on the Tulalip Landfill Site.
September 13, 1995	EPA released a fact sheet announcing the extension to the public comment period and announcing the time and location of an additional public meeting.
September 20, 1995	EPA ran a newspaper ad in the <u>Everett Herald</u> and in the <u>Marysville Globe</u> announcing



another extension on the public comment period and an additional public meeting to discuss the Proposed Plan.

October 3, 1995 EPA held an additional public meeting, at the request of one of the Potentially Responsible Parties, to discuss the Proposed Plan. The meeting was held from 10:00 a.m. to 5:30 p.m. in Seattle.

October 25, 1995 Comment Period closed.

Selection of the interim remedy is based on the Administrative Record. There are two copies of the Administrative Record available for public review. One copy is located at the EPA Region 10 office at 1200 Sixth Avenue, in Seattle, Washington. The second copy is located at the Marysville Public Library in Marysville, Washington.

#### 4.0 SCOPE AND ROLE OF INTERIM RESPONSE ACTION

Based on EPA's experience of evaluating Superfund remedies at many landfill sites across the country, the remedy for landfills almost universally consists of containing the landfill wastes in place to prevent migration of contaminants off of the Site.<sup>6</sup> Waste in Superfund landfills usually is present in large volumes and is a heterogeneous mixture of commercial, industrial, hazardous, and municipal wastes. Consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (or NCP), EPA's expectation is that containment technologies will be appropriate for landfill waste because the volume and heterogeneity of the waste generally make treatment impractical. For the source areas<sup>7</sup> of "Superfund" landfill sites, EPA generally considers containment to be the appropriate response action, or the "presumptive remedy." The objective of using a presumptive remedy approach is to use past experience to streamline site investigation, to speed up selection of cleanup actions, and to increase the cost effectiveness of the remedy selection process.

Containment remedies usually include installing a low permeability cover to keep rain water from filtering down through the landfill wastes. Containment may also include some form of leachate collection and treatment, some form of landfill gas collection, or some form of ground water control. EPA has

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<sup>6</sup> Presumptive Remedy for CERCLA Municipal Landfill Sites (EPA 540-F-93-035, OSWER Directive #9355.0-49FS, September, 1993).

<sup>7</sup> In general, a "source area" refers to an area of a site that acts as a contaminant source to other areas.



published several guidance documents that EPA Region 10 used to design the RI/FS work plan that the Respondents followed, including a streamlining manual entitled *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, February 1991 (OSWER Directive 9355.3-11) (also referred to later as the *Municipal Landfill Manual*), *Presumptive Remedies for Municipal Landfill Sites*, April 1992 and February 1993 (EPA Publication 9203.1-02I), *Presumptive Remedies*, August 1992 (SACM Bulletin Vol. 1, No.3), and *Streamlining the RI/FS for CERCLA Municipal Landfill Sites*, September 1990. In addition, as described below, EPA has conducted an analysis of potentially available technologies for CERCLA landfills and found that certain technologies are routinely and appropriately screened out on the basis of effectiveness, feasibility, or cost, consistent with NCP Section 300.430(e)(7). The *Feasibility Study Analysis for CERCLA Municipal Landfills*, September 1993, provides an evaluation of 30 CERCLA landfill FS reports that support initial identification and screening of technologies for selection of the landfill remedy.

This streamlined presumptive remedy approach is appropriate at Tulalip Landfill. In the RI/FS Work Plan (which is part of the RI/FS AOC), the Tulalip Landfill was deemed appropriate for remedial action because concentrations of contaminants at the landfill exceeded the established standards of ambient water quality criteria (RI/FS Work Plan, page 4-1). Containment is the presumptive remedy which EPA found to be most commonly suited for municipal landfills because these landfills, as well as the Tulalip Landfill,<sup>8</sup> share the following characteristics: (1) large volume and heterogeneity of waste which make treatment impractical; (2) limited number of alternatives for controlling releases; (3) similar potential threats to human health and the environment resulting from leachate generation, soil contamination, landfill contents, landfill gases, and contamination of ground water, surface water, sediments and adjacent wetlands; and (4) the nature of waste deposition. See generally "Presumptive Remedy for CERCLA Municipal Landfill Sites," OSWER Dir. No. 9355.0-49FS, September, 1993. Because the Tulalip Landfill shares these characteristics with municipal landfills, EPA has concluded that the presumptive remedy approach is appropriate for the Tulalip Landfill.

The streamlined approach that EPA has adopted at this Site is consistent with CERCLA, the NCP, and EPA guidance on presumptive remedies. One important principle throughout the RI/FS and remedy selection provisions in the NCP is the "bias for action." EPA emphasized the "bias for action" in the NCP partly

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<sup>8</sup> While EPA considers the Tulalip Landfill to be a solid waste landfill but not a municipal landfill, EPA believes that using the municipal landfill presumptive remedy guidance at the Tulalip Landfill is appropriate.



in response to criticisms that the Superfund program was too slow, too costly, and unpredictable. At 40 C.F.R. Section 300.430(a)(1), the NCP states: "Remedial actions are to be implemented as soon as site data and information make it possible to do so." At 40 C.F.R. Section 300.430(a)(1)(ii), the NCP states:

"EPA generally shall consider the following general principles of program management during the remedial process:

(A) Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup."

In the case of Tulalip Landfill, EPA believes an early, interim remedial action is necessary and appropriate to achieve significant risk reduction quickly. Because of the size and complexity of the site, the RI/FS Work Plan was structured to describe a phased analysis of the on-source and off-source areas. Based on the results of the RI/FS, the completed Streamlined Risk Assessment (see Section 6.0 - Description of Site Risks), and public comments received on the Proposed Plan, a phased response (i.e., early implementation of source control) is appropriate while analysis of the wetlands surrounding the landfill continues. Early implementation of source control will expedite the completion of total site cleanup because it will stem the flow of contaminants onto the off-source wetlands, thereby eliminating chemical discharges to the wetlands that exceed comparison numbers, and reducing total chemical loading from the site to the wetlands surrounding the landfill. Early source control may help the wetlands around the landfill recover naturally from site discharges more quickly.

The "bias for action" generally involves a balancing process, i.e., deciding how to balance the need for prompt, early actions against the need for definitive site characterization. This balancing process is specifically linked to the RI/FS, including the risk assessment, at 40 C.F.R. Section 300.430(a)(2):

"Developing and conducting an RI/FS generally includes the following activities: project scoping, data collection, risk assessment, treatability studies, and analysis of alternatives. The scope and timing of these activities should be tailored to the nature and complexity of the problem and the response alternatives being considered."



The streamlined baseline risk assessment that has been completed for the source area of the Tulalip Landfill Site reflects the nature and complexity of the problem and the response alternatives being considered.

The EPA guidance document "Presumptive Remedy for CERCLA Municipal Landfill Sites (September 1993)"<sup>9</sup> states:

"As a matter of policy, for the source area of municipal landfills, a quantitative risk assessment that considers all chemicals, their potential additive effects, etc., is not necessary to establish a basis for action if ground water data are available to demonstrate that contaminants clearly exceed established standards or if other conditions exist that provide a clear justification for action."

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"Almost every municipal landfill site has some characteristic that may require additional study, such as leachate discharge to a wetland or significant surface water run-off caused by drainage problems. These migration pathways, as well as ground-water contamination that has migrated away from the source, generally will require characterization and a more comprehensive risk assessment to determine whether action is warranted beyond the source area and, if so, the type of action that is appropriate."  
(underlining added).

The approach EPA has adopted for this site is wholly consistent with this guidance. EPA is in the process of developing a more comprehensive risk assessment which focuses on the wetland areas surrounding the landfill. The comprehensive risk assessment will be used to determine whether additional remedial action is warranted in the wetlands, and if so, to support EPA's decision regarding the type of action that is appropriate.

The Proposed Plan identified EPA's preferred alternative for containing the landfill wastes through an Interim Remedial Action by installing a low permeability cover over the waste. Consistent with the program management principles of the NCP Section 300.430(a) and the presumptive remedy guidance, EPA proposed to proceed with an early action to contain the landfill wastes, in this case with an early interim remedial action operable unit. (An operable unit is a portion of a Superfund

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<sup>9</sup> In the preamble to the 1990 NCP, EPA stated that it was in the process of developing guidance on expected remedies for specific types of sites (e.g., municipal landfills) and specific types of waste (e.g., PCBs) that will assist in streamlining decision-making and promoting greater efficiency. See 55 Fed. Reg. at 8725.



site; in this case, it refers to the source area of the landfill). EPA plans to initiate design and construction of the containment remedy in 1996.

The Feasibility Study (FS) for Tulalip Landfill is being conducted by the Respondents in two parts; the first part, called the Source Area Containment Feasibility Study, evaluates various containment alternatives for the landfill source area.<sup>10</sup> The final Source Area Containment Feasibility Study was submitted to EPA on May 4, 1995. The second part, called the Site FS, may be completed in summer, 1996. The purpose of the Site FS is to identify and evaluate additional measures that could be taken to clean up the wetlands and tidal channels that surround the source area.<sup>11</sup>

The Streamlined Risk Assessment that has been completed by EPA is sufficient for the purpose of selecting a containment solution as an interim remedy. EPA's decision that an interim remedial action is appropriate at this time based on current information is consistent with CERCLA, the NCP, and EPA guidance.

This is an interim remedial action ROD. Any remedial action for the area surrounding the landfill, or additional remedial action for the source area, will be specified in the final Site ROD. In preparation of a final remedial decision for the wetlands surrounding the landfill (i.e., the "off-source" area), EPA plans to complete the comprehensive baseline risk assessment, evaluate the Site FS for the off-source area, and consider the results of the source area containment remedy. The selected interim remedy would be compatible with any possible future cleanup actions at the Site, since it is expected to minimize the potential for generation and migration of new leachate to these off-source areas. EPA also expects to work closely with the federal, tribal, and state natural resource trustees in evaluating the appropriate response for the wetlands, sediments, and other off-source resources. A review will be conducted no less often than every five years after commencement of remedial action to ensure that the interim remedy continues to provide

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<sup>10</sup> The source area of the landfill is considered to include approximately 147 acres of waste and the surrounding perimeter landfill berm. The off-source area is considered to include any part of the Site that is located outside the perimeter berm. Figure 1-2 clearly shows the location of the perimeter berm.

<sup>11</sup> As a point of clarification, EPA notes that although the phased, presumptive remedy approach has led to two separate FS reports (the SAC FS and the Site FS), and two separate risk assessments (the streamlined baseline risk assessment for the on-source area, and the comprehensive baseline risk assessment for the off-source area), there is only one RI Report for the Site. The final RI Report (May, 1995) is available for public review in the Administrative Record for this early/interim remedial action.



adequate protection of human health and the environment. Because this is an interim action ROD, review of this Site and this remedy will be ongoing as EPA continues to develop final remedial alternatives for the off-source area. If EPA's review indicates that the interim action is not providing adequate protection, additional containment action, such as implementation of a perimeter leachate seep collection and treatment system, may be necessary.

## 5.0 SUMMARY OF SITE CHARACTERISTICS

Three to four million tons of mixed commercial and industrial waste was placed at the Tulalip Landfill between 1964 and 1979. Figure 5-1 is a map of the Site that shows the thickness of the waste across the landfill. This waste is the source of contamination at the Site. Although no records detail the exact types of waste buried at Tulalip Landfill, investigations indicate that most of the waste is commercial or trade waste, including lumber, newspapers, cardboard, plastic bags, rubber tires, scrap metal, glass, cloth, sawdust, and cobbles. Although logs were banned from further disposal at the Site in 1970, some logs have been identified in the fill in addition to demolition debris and small boulders. Other waste in the landfill includes: dredge spoils from at least one shipping terminal project, hospital wastes, waste and still bottoms from the manufacture of artificial vanillin, and small, incidental amounts of municipal wastes. These types of wastes contain a wide variety of hazardous substances that vary in toxicity, mobility, and carcinogenicity. During the late 1980's, approximately 225,000 tons<sup>12</sup> of additional materials was placed on the surface of the landfill as part of a project to construct a more effective landfill cover.

Data collected at the Site, including data from the Remedial Investigation, shows that contaminants are migrating from the waste mass into the surrounding environment. People, animals, and plants are potentially exposed to these contaminants.

### 5.1 GEOLOGY

The landfill is situated on the Snohomish River delta in a Quaternary topographic and structural basin known as the Puget Sound lowland. This lowland consists of a series of ridges and valleys that tend to run north-south, which are the result of repeated sediment deposition and erosion by glaciers and associated glacial processes. The separate mesa-like plateaus of the Puget Sound lowland are altered remnants of a former continuous topographic surface that was dissected by the pre- and

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<sup>12</sup> See Revised Feasibility Study for Source Area Containment (SAC-4), May 4, 1995, pages 37 and 38.



post-Vashon erosion and further eroded by contemporary rivers such as the Snohomish River.

Most of the surface and shallow subsurface geologic units present in the landfill vicinity consist of unconsolidated sediment deposited during the Vashon Stage of the Fraser glaciation, which ended 11,000 years ago, or are the result of recent sediment deposition by the Snohomish River and its tributaries. The geologic unit on which the landfill was developed is called the alluvium and estuarine deposits. This geologic unit is the youngest deposit of regional significance in the study area. Other regionally significant geologic units near the landfill, in order of increasing age, include the sandy recessional outwash deposits; till consisting of an unsorted mixture of clay, silt, sand, and gravel; advance outwash consisting of layered sand overlain by sandy gravels; and transitional beds which consist mostly of thick beds of clay, silt, and fine sand.

Figure 5-2 is a general north-south cross section diagram of the landfill that shows the stratigraphic units or zones that have been identified at the Site. There are five of these:

- cover material which consists of 1 to 11.5 feet of primarily sandy silt placed over the refuse during closure;
- the refuse, ranging in thickness from 6 to 35 feet;
- a discontinuous silt layer with a thickness of 0 to 10 feet which underlies the refuse throughout much of the landfill;
- "Zone 2," which consists of a silty sand layer ranging in thickness from 15 to 22 feet; and
- a "Deeper Zone" which consists of sand, silty sand, and clay and estuarine deposits.

Two of these units, the cover material and the refuse, exist at the Site as a result of the landfiling activities, while the other three units, the silt layer, Zone 2, and Deeper Zone, are site-specific subunits of the alluvium and estuarine deposits. The cover material, the refuse layer, Zone 2, and the Deeper Zone are relatively permeable layers; water is able to move through them. The silt layer is of relatively low permeability, but Site studies show that the silt layer is not continuous. In addition to natural breaks shown in Figure 5-2, the man-made barge canals penetrate the silt layer.

## 5.2 HYDROGEOLOGY

Figure 5-3 shows a conceptual hydrologic model of the Site, which illustrates current understanding of how contaminants



migrate from the landfill to the surrounding environment. When precipitation falls on the landfill, most of the rain water infiltrates down through the cover soil and sinks down into the refuse layer, picking up contamination from the waste as it moves. Over the years, a large mound of this contaminated ground water, or leachate, has accumulated within the refuse layer. In Figure 5-3, this leachate mound is described as the "Zone 1" aquifer. The leachate mound within the waste ranges in height from approximately 11 to 16 feet above mean sea level (MSL) which corresponds to a saturated refuse thickness of 14 to 26 feet. The amount of leachate in Zone 1 fluctuates seasonally; in winter months when there is more precipitation, and infiltration into the landfill exceeds the discharge rate, the height of the leachate mound tends to rise within the waste; in the drier summer months when the infiltration rate falls below the discharge rate, the height of the leachate mound tends to fall.

The results of the RI indicate that the leachate mound is not affected by tidal fluctuations of the surface water surrounding the landfill (ie., the height of the leachate mound is unaffected by tidal action). The mean high tidal water level in the landfill vicinity is about 4 feet above MSL, and the mean low tidal water level is about 3 feet below MSL. The highest tide level ever recorded in the area was about 8.5 feet above MSL, and the lowest was about 9.5 feet below MSL. The wetlands surrounding the landfill range between approximately 3 to 6 feet above MSL, so during a high tide the water can submerge the lower part of the landfill berm. The surface water surrounding the landfill contains high levels of salt compared to the freshwater nature of the leachate mound, which suggests that if any surface water surrounding the landfill infiltrates the landfill waste due to tidal fluctuations, such infiltration is minimal. EPA is unaware of any flood events that have submerged the landfill surface.

The leachate in Zone 1 discharges to the wetlands and sloughs surrounding the landfill, carrying contaminants from the landfill with it. Some of this leachate, between approximately 5% to 35% of the total, discharges through the perimeter landfill berm onto wetlands surrounding the Site, and can be visually observed exiting the external face of the berm as "leachate seeps." There are numerous leachate seeps around the landfill perimeter, some of which are transient in nature. The remainder of the Zone 1 leachate, estimated at about 65% to 95% of the total, is driven downward by the weight of the leachate mound through holes in the silt layer, and through the silt layer itself, into the Zone 2 aquifer beneath the landfill. Figure 5-4 is a map that shows the average potentiometric surface in Zone 2 over a 72-hour period in March, 1994. The potentiometric surface of the Zone 2 aquifer shown in this figure suggests that the leachate mound within the landfill exerts pressure on the Zone 2 aquifer, indicating that leachate is being driven down through



the silt layer or through gaps in the silt layer, into Zone 2 and outward away from the landfill. The RI indicates that this Zone 2 leachate migrates beneath the perimeter berm and discharges to surrounding surface waters, principally into Ebey Slough to the north and Steamboat Slough to the south. On an annual basis, the perimeter seeps contribute between approximately 5.3 million gallons to 13.1 million gallons per year to the surrounding environment, and the leachate contribution through Zone 2 is between approximately 21 million and 175 million gallons per year.

### 5.3 SITE DATA

This section briefly summarizes the sampling of on-source and off-source media that has been performed at the Site, and lists the most frequently detected chemicals that were found in each media. For purposes of discussion in this interim ROD, examples of Site sampling "media" include: surface water, Zone 1 ground water, Zone 2 ground water, Deeper Zone ground water, leachate seeps, surface soil, subsurface soil, surface sediment, and fish tissue). "On-source" data refers to chemical data collected from the landfill source area, which includes the landfill surface and contents, the surrounding perimeter landfill berm, and ground water within and beneath the waste. "Off-source" data refers to chemical data collected in the wetland areas and tributaries adjacent to the berm and bounded by Ebey and Steamboat Sloughs (leachate exiting the exterior face of the perimeter berm is considered to be off-source).

#### 5.3.1 On-Source Data

Sample data collected in on-source media (surface water and surface soil;<sup>13</sup> Zone 1, Zone 2, and Deeper Zone groundwater; and surface water) are briefly described below.

**Surface Water:** During the 1988 Site Investigation, water samples were collected from five pooled surface water locations on the landfill. The following chemicals were detected in 50% or more of these surface water samples: acetone, naphthalene, aluminum, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc.<sup>14</sup>

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<sup>13</sup> Because the on-source surface water and on-source surface soil data was taken in 1988, prior to the RI, it may not be representative of current landfill conditions. EPA has considered the 1988 data but has not relied upon it to support any conclusions in this interim ROD. EPA's consideration of these data has not changed EPA's conclusions in this interim ROD.

<sup>14</sup> In other words, acetone was detected in at least 50% of all on-source surface water samples; naphthalene was detected in at least 50% of all on-source surface water samples, etc.



Leachate seep SP-01 is a seep that originates on the landfill surface, above the berm, and discharges off the berm into the surrounding wetlands. In addition to the pooled water samples, data from this seep is considered to be on-source surface water data. Detection frequency information for this seep is summarized below, as part of the detection frequency summary of all of the leachate seeps.

**Surface Soil:** Surface soil samples were also collected at these five sample locations during the 1988 Site Investigation. Some chemicals were detected in these samples. However, none of the chemicals in the analysis were found in more than 50% of all the samples that were taken.

**Zone 1 Groundwater:** Groundwater was sampled from Zone 1, which is the leachate mound located in the refuse layer, at four well locations. These wells were each sampled once near the beginning of the RI. Chemicals that were detected in 50% or more of all the samples taken from the Zone 1 wells include volatile organic compounds (benzene, 2-hexanone, toluene, chlorobenzene, ethylbenzene, total xylene, 1,3-dichlorobenzene, 1,4-dichlorobenzene); semi-volatile organic compounds (2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, diethylphthalate, fluorene, phenanthrene, anthracene, retene); the semi-volatile indicator compound dehydroabiatic acid; pesticides (gamma-BHC [Lindane], heptachlor epoxide); total metals (aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, potassium, sodium, zinc); and total cyanide, ammonia nitrogen, and total phenol.

**Zone 2 Groundwater:** Groundwater was sampled from Zone 2, which is located below the refuse layer, at 24 well locations. Six sampling rounds were conducted for Zone 2 wells located on landfill perimeter berm, one round every other month, over a 12-month period during the RI. Zone 2 wells located in the landfill interior were sampled just once during the first sampling round. Chemicals that were detected in 50% or more of all the samples taken from the Zone 2 wells include the semi-volatile compound bis(2-ethylhexyl)phthalate; total metals (aluminum, barium, calcium, chromium, iron, magnesium, manganese, potassium, sodium, vanadium); and ammonia nitrogen and total phenol.

**Deeper Zone Groundwater:** Deposits beneath the Zone 2 consist of sand, silty sand, and clay and are referred to as the Deeper Zone. Two monitoring wells were installed in the deeper Zone, and one sample was taken from each of these wells during the first sampling round. Chemicals that were detected in 50% or more of the samples taken from the deeper zone wells include volatile organic compounds (acetone, chloroform, 2-butanone, toluene, total xylene); the semi-volatile organic compound diethylphthalate, the semi-volatile indicator compound



dehydroabiatic acid; total metals (barium, cadmium, calcium, iron, magnesium, manganese, potassium, selenium, sodium, zinc); and total cyanide, ammonia nitrogen, and total phenol.

### 5.3.2 Off-Source Data

Sample data collected in off-source media (surface and subsurface soil, surface and subsurface sediment, surface water, and leachate seeps) are briefly summarized below:

**Surface Soil:** Surface soil was sampled from grids extending into the wetlands around leachate seeps and from fifteen locations in the high estuarine wetlands and salt marshes located immediately west of the landfill. In all, 106 off-source soil samples were taken, including 5 replicate samples collected by the Respondents and 10 duplicate samples taken by EPA.

Chemicals that were detected in 50% or more of all the soil samples taken by the Respondents from the *high estuarine wetlands*, which are located just off the western boundary of the landfill, include the semi-volatile organic compound indicator dehydroabiatic acid; polynuclear aromatic hydrocarbons (phenanthrene, fluoranthene); total metals (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc); and total cyanide.

Chemicals that were detected in 50% or more of all the soil samples taken by the Respondents *near the leachate seeps* include semi-volatile organic compounds (phenanthrene, fluoranthene, pyrene, chrysene, benzo(b)fluoranthene); the semi-volatile indicator compound dehydroabiatic acid; polynuclear aromatic hydrocarbons (phenanthrene, fluoranthene); and total metals (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc).

**Subsurface Soil:** Subsurface soil was sampled near six of the leachate seeps along the edges of the landfill. Samples were taken at 6-inch intervals to a depth of 2 feet. In all, 20 off-source subsurface soil samples were taken, including two duplicate samples collected by EPA. Chemicals that were detected in 50% or more of all the subsurface soil samples taken by the Respondents include semivolatile organic compounds (1,4-dichlorobenzene, 2-methylnaphthalene, acenaphthene, dibenzofuran, carbazole, pyrene, chrysene, bis(2-ethylhexyl)phthalate, benzo(b)fluoranthene); the semi-volatile indicator compound dehydroabiatic acid; polynuclear aromatic hydrocarbons (naphthalene, fluorine, phenanthrene, anthracene, fluoranthene, pyrene); the pesticide gamma-BHC (Lindane); the polychlorinated biphenyl ("PCB") Aroclor-1242; and total metals (aluminum,



arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc).

**Surface Sediment:** Surface sediment was sampled at 46 locations around the landfill. In all, 52 samples were taken, including six duplicate samples collected by EPA. Chemicals that were detected in 50% or more of off-source surface sediment samples taken by the Respondents include: 4-Methylphenol, phenol, phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)pyrene, aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc.

**Subsurface Sediment:** Subsurface sediment was sampled at six of the sediment sampling locations. Samples were taken at 6-inch intervals to a depth of 2.0 feet. In all, 20 samples were taken, including two duplicate samples collected by EPA. Chemicals that were detected in 50% or more of all the off-source subsurface sediment samples taken by the Respondents include 2-Methylnapthalene, 4-methylphenol, dibenzofuran, napthalene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc.

**Surface Water:** Surface water was sampled at 18 locations around the landfill. Twenty samples were taken, including two duplicate samples collected by EPA. Chemicals that were detected in 50% or more of all the surface water samples taken by the Respondents include the following total metals: aluminum, barium, calcium, and iron.<sup>15</sup>

**Leachate Seeps:** Leachate was sampled at 10 off-source locations around the landfill (leachate seeps SP02 through SP11) and one on-source location (SP01). With the exception of leachate seep SP01, in general, leachate seep samples were taken at the point where leachate exited the perimeter landfill berm before discharging onto the wetlands surrounding the Site. Six sampling rounds were conducted during the RI, one every other month, for a year. Fifty-five samples were taken, including seven duplicate samples collected by EPA. Chemicals that were detected in 50% or more of leachate samples taken by the

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<sup>15</sup> Lead, which exceeded Ambient Water Quality Criteria at one off-source surface water location, was detected in 40% of all off-source surface water samples.



Respondents during rounds 1 through 5<sup>16</sup> include volatile organic compounds (benzene, chlorobenzene, total xylene, 1,4-dichlorobenzene); semi-volatile organic compounds (2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorine, phenanthrene, retene); the semi-volatile indicator compound dehydroabiatic acid; total metals (aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, potassium, nickel, sodium, vanadium, zinc); ammonia nitrogen and total phenol.<sup>17</sup>

**Fish Tissue:** Twenty-four composite fish tissue samples were taken from tidal channels surrounding the landfill. Some of the chemicals that were detected in 50% or more of all the fish tissue samples include PCB Aroclor-1254, mercury, arsenic, chromium, and vanadium.

#### 5.4 EXPOSURE PATHWAYS

The results of Site studies indicate that contaminants are migrating from the landfill to the surrounding environment. Table 5-1 lists chemicals that have been found in various on-source and off-source media. The high number of chemicals that are common across different media, in combination with information that has been learned about the Site geology and hydrogeology, indicates that water infiltrating the waste mobilizes chemicals in the waste, and then transports them off site via the perimeter leachate seeps and Zone 2 ground water. These chemicals from the landfill have subsequently accumulated in off-source media including surface soil, subsurface soil, surface sediment, subsurface sediment, and fish tissue. Page 6-6 of the RI concludes that surface soil chemical concentrations were highest nearest the seeps discharge points and lower further from the seeps, which suggests that chemicals migrating from the landfill are likely causing elevated chemical concentrations in off-source areas.

There are many potential routes, or pathways, by which exposure to landfill contaminants can occur. Figure 5-5 shows a Human Health Conceptual Site Model, which describes the potential pathways for human exposure to Site contaminants. Potential pathways evaluated in the streamlined baseline Risk Assessment

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<sup>16</sup> The source of this summary of the leachate seep data is Remedial Investigation Table 4-20, entitled "Summary of Leachate Seep Water Analytical Results for Rounds 1 through 5. Apparently, leachate data from the sixth round was not yet available for inclusion in this Table.

<sup>17</sup> In many of the water media, dissolved metals were also detected in addition to total metals. In the leachate seep samples, for example, dissolved metals that were found in 50% or more of all the samples include aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, iron, magnesium, manganese, potassium, nickel, sodium, and zinc.



for Interim Remedial Action (the "Streamlined Risk Assessment") include ingestion of on-source and off-source soil, ingestion of fish or shellfish that have contacted leachate, ingestion of fish or shellfish in surface water near the Site, and ingestion of off-source sediment.

Figure 5-6 is an Ecological Conceptual Site Model, which shows the potential exposure pathways for ecological receptors including animals and plants. Potential pathways for ecological receptors evaluated in the Streamlined Risk Assessment include plant and subsequent bird and mammal uptake of contaminants in off-source and on-source soil; invertebrates and fish uptake associated with leachate, off-source and on-source surface water; and invertebrate uptake associated with off-source sediment. As Figures 5-5 and 5-6 indicate, additional potential exposure pathways for terrestrial and aquatic organisms and humans will be evaluated in a comprehensive baseline risk assessment which EPA has begun to prepare.

People that use the on-source or off-source areas of the Site are potentially exposed to contaminants in or emanating from the landfill. People that could be exposed include current and future recreational users, and future industrial or commercial users.<sup>18</sup> Potentially exposed ecological populations include plants on or near the Site; and animals, including fish, otter, rodents, water fowl, and raptors that use the Site or the wetlands surrounding the Site.

## 6.0 DESCRIPTION OF SITE RISKS

Using sample data collected from the Site, the U.S. Environmental Protection Agency (EPA) conducted a streamlined baseline risk assessment to evaluate the health and/or environmental problems that would result if the contamination is not addressed. This qualitative analysis, called the Tulalip Landfill Risk Assessment for Interim Remedial Action, August, 1995 (the "Streamlined Risk Assessment"), has been prepared in accordance with the National Contingency Plan (NCP) and EPA guidances on risk assessments and presumptive remedies.<sup>19</sup>

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<sup>18</sup> Light industrial or commercial use is consistent with potential future land uses as identified by the Tulalip Tribes (see "Big Flats Land Use Program", Tulalip Tribes of Washington, July 10, 1994, in the administrative record).

<sup>19</sup> The Tulalip Landfill Risk Assessment for Interim Remedial Action is a streamlined baseline risk assessment as described by EPA guidance -- see *Streamlining the RI/FS for CERCLA Municipal Landfill Sites* (OSWER Directive: 9355.3-11FS, December, 1990, page 3, section entitled "Streamlining the Baseline Risk Assessment." See also the Responsiveness Summary for this ROD.



The preamble to the National Contingency Plan (NCP) and EPA guidance provides information on how EPA suggests risk assessments may be conducted at Superfund sites of varying scope and complexity. The Streamlined Risk Assessment is consistent with the NCP preamble language, which emphasizes a "bias for action" in how to balance the need for prompt, early actions against the need for definitive site characterization. The NCP states:

"EPA expects to take early action at sites where appropriate, and to remediate sites in phases using operable units as early actions to eliminate, reduce or control the hazards posed by a site or to expedite the completion of total site cleanup. In deciding whether to initiate early actions, EPA must balance the desire to definitively characterize site risks and analyze alternative remedial approaches for addressing those threats in great detail with the desire to implement protective measures quickly. Consistent with today's management principles, EPA intends to perform this balancing with a bias for initiating response actions necessary or appropriate to eliminate, reduce, or control hazards posed by a site as early as possible."

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"To implement an early action under remedial authority, an operable unit for which an interim action is appropriate is identified. Data sufficient to support the interim action decision is extracted from the ongoing RI/FS that is underway for the site or final operable unit and an appropriate set of alternatives is evaluated...A completed baseline risk assessment generally will not be available or necessary to justify an interim action."

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"Qualitative risk information should be organized that demonstrates that the action is necessary to stabilize the site, prevent further degradation, or achieve significant risk reduction quickly." 55 Federal Register 8704 (March 8, 1990) (underlining added).

The Streamlined Risk Assessment was developed in accordance with this language. Consistent with the presumptive remedy guidance for streamlining the RI/FS process, the RI focused on characterizing areas where contaminant migration away from the landfill was suspected.

In compliance with the NCP and EPA guidance, the Streamlined Risk Assessment compares chemical concentrations found in various media (for example: ground water; leachate exiting the landfill;



surface soil, water, and leachate on the landfill surface; and sediments and soils adjacent to the landfill) at the Site with what are hereinafter referred to as "comparison numbers".<sup>20</sup> These comparison numbers are established standards and criteria, and calculated risk-based concentrations, that are generally considered to be protective of human health and the environment.<sup>21</sup> These comparison numbers, with the exception of the soil risk-based concentrations, have been established or developed under federal or state laws.

The Streamlined Risk Assessment assumes a commercial/industrial future use exposure scenario because this is consistent with the Future Land Use Plan<sup>22</sup> that the Tulalip Tribes have developed for the Site. A residential exposure scenario was not used. The Tribes have designated the landfill surface for recreation and possible economic development in the form of commercial or light industrial use, and the surrounding wetlands are designated for preservation as wetlands for traditional hunting and fishing.

In addition to the completed Streamlined Risk Assessment, EPA is currently preparing a comprehensive baseline risk assessment for the off-source area of the Site. This comprehensive baseline risk assessment will support decisions on the need for response actions in the off-source area.

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<sup>20</sup> After evaluating public comments on the Proposed Plan, it is apparent to EPA that some commentors were misled by EPA's use of the phrase "screening criteria" in the Streamlined Risk Assessment to refer to standards, criteria, and risk-based concentrations used in the streamlined Risk Assessment. To clarify this issue, EPA is using the more accurate phrase "comparison numbers" to refer to these standards, criteria, and risk-based concentration. EPA notes that these comparison numbers have been selected for use in the Streamlined Risk Assessment for the purpose of evaluating potential risks posed by the Site. These comparison numbers are not necessarily ARARs.

<sup>21</sup> Water quality standards and criteria are not necessarily protective of wildlife or benthic organisms. EPA has been evaluating how to produce water quality criteria that are protective of wildlife. The salient issues in EPA's effort include evaluating bioaccumulation (from all routes of exposure; food, sediment, water, etc.), bioconcentration (usually just through exposure to water), and biomagnification (increasing tissue concentrations with hierarchy in the food web). Some of the first contaminants to be evaluated in this manner include mercury and DDT, two contaminants that are discharging from the Site. Water quality standards and criteria may be made more stringent in the future to address these concerns (EPA notes, however, that ARARs for this interim remedial action are frozen when this interim ROD is signed).

<sup>22</sup> Big Flats Land Use Program, Tulalip Landfill Remedial Investigation and Feasibility Study (July 10, 1994).



## 6.1 HUMAN HEALTH EVALUATION

The human health evaluation in the Streamlined Risk Assessment selects comparison numbers that represent concentration levels that are considered to be protective of people using the site for commercial/industrial purposes, and then compares site-specific analytical data to these comparison numbers. In general, comparison numbers include established standards, criteria, and risk-based concentrations. Various media on and adjacent to the landfill, including surface water, ground water, surface soil, subsurface soil, leachate seeps, surface sediment, and subsurface sediment, were sampled during the Remedial Investigation. The Streamlined Risk Assessment compares the sample results from these media to the comparison numbers, and exceedences of the comparison numbers are summarized and reported.

Human health comparison numbers for soils and sediments were derived from two sources. A commercial/industrial scenario was assumed for selection of soil and sediment comparison numbers (comparison numbers for a recreational scenario were unavailable). For each chemical, the lower of the two values derived from the following sources was selected:

- EPA Region 3 risk-based concentration tables for industrial exposures;
- Model Toxics Control Act (MTCA) Method C values for industrial/commercial exposures (Chapter 173-340-740 Washington Administrative Code, Washington Department of Ecology, 1995)

The Region 3 risk-based concentrations have been developed by EPA using Risk Assessment Guidance for Superfund (EPA, 1989) algorithms and toxicity information contained in both EPA's Integrated Risk Information System (IRIS) database and Health Effects Assessment Summary Tables (HEAST). Region 3 updates these concentrations on a quarterly basis. The Region 3 risk-based concentrations are considered to be protective of the ingestion pathway, but are not considered to be protective of other potential exposure routes such as inhalation, nor would they be expected to prevent contaminant migration, such as contaminants leaching from soil to ground water or surface water.

For surface water, leachate, and ground water that discharges to surface water, comparison numbers were calculated based on the indirect pathway of ingestion of seafood harvested from surface water near the landfill, using:

- EPA Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance Final Rule (EPA, 1992a).



The comparison numbers were calculated based on a  $1 \times 10^{-6}$  cancer risk, assuming consumption of 6.5 gm of fish per person per day. This consumption rate was based on a national average; however, this rate is likely below the fish consumption rate of Tulalip Tribal members. A more realistic (i.e., higher) exposure consumption rate for Tribal members will be developed and used in the comprehensive baseline risk assessment for the Site FS, which will evaluate the need for additional response actions for the off-source area. Human health comparison numbers for specific contaminants in specific media are provided in Table 6-1.

Site-specific data were evaluated against the comparison numbers. Chemicals that exceed the human health comparison numbers were found in leachate exiting the perimeter landfill berm through the leachate seeps, off-source surface sediments, off-source subsurface sediments, off-source surface soils, and off-source surface water in the tidal channels near leachate seeps. Results of the comparison of Site data to human health comparison numbers are shown in Table 6-2. This table includes information on the frequency of exceedences in each medium.

Chemicals found in the leachate discharging from the perimeter berm through the leachate seeps that were measured at levels at least an order of magnitude (ten times) higher than the human health comparison numbers include 4,4'-DDT, 4,4'-DDD, 4,4'-DDE, aldrin, Aroclor-1016, Aroclor-1232, Aroclor-1254, arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dieldrin, indeno(1,2,3-cd)pyrene, heptachlor, and heptachlor epoxide.

Chemicals exceeding the comparison numbers in soils and sediments adjacent to the landfill surface include Aroclor 1242 and Aroclor 1248, arsenic, beryllium, heptachlor epoxide, and polycyclic aromatic hydrocarbons (PAHs). Of these, arsenic had the highest frequency of exceedance (98 to 100 per cent in soil and sediment samples taken adjacent to the surface of the landfill).

The RI/FS approach for evaluating Zone 2 ground water was to measure ground water chemical concentrations at 13 perimeter landfill berm wells. Based on this data from the berm wells, the Respondents used a ground water modeling technique to predict the degree of contaminant dilution that would be expected between the berm wells and the location where Zone 2 ground water enters the sloughs, which is where sediment-dwelling organisms would be impacted and, according to State law, is where State water quality standards must be applied. The results of the Respondents' ground water modeling indicated that, in general, one would expect contaminants in the berm wells to be diluted by a factor of 5 to 9 by the time they reached the sloughs. This reduction of average concentrations would result primarily from



the contaminated ground water measured at the berms becoming diluted from mixing with cleaner, uncontaminated ground water as it moved toward the sloughs.

Assuming a concentration reduction at the low end of the range predicted by the modeling, 5 times, arsenic would be expected to exceed the human health comparison numbers at the location where Zone 2 ground water enters the sloughs:

<u>Chemical</u>	<u>Frequency of Exceedances</u>
Arsenic - total	17/73
Arsenic - dissolved	3/26

Assuming a concentration reduction at the high end of the range predicted by the modeling, 9 times, arsenic still exceeds the comparison numbers at the same frequency at the location where Zone 2 ground water enters the sloughs:

<u>Chemical</u>	<u>Frequency of Exceedances</u>
Arsenic - total	17/73
Arsenic - dissolved	3/26

Based on this evaluation, and if the concentration reduction factor predicted by the modeling (5 to 9 times) between the berm wells and the Zone 2/slough interface is assumed,<sup>23</sup> arsenic would be expected to exceed the human health comparison numbers at the location where Zone 2 discharges to surface water.

Figure 6-1 is a map of the Site that shows sampling locations of the most significant site data exceedances of the human health comparison numbers. Sample data at the locations shown in this Figure exceed the comparison numbers by at least an order of magnitude.

In addition to information regarding chemical contaminants at the Site, EPA presented a summary of microbial data from samples taken over a period of twenty years at and around the Tulalip Site. See Streamlined Risk Assessment Appendix C.

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<sup>23</sup> EPA believes the Respondents' modeling effort is not sufficiently conservative for a number of reasons. For example, the Respondents' model, a model called Seep-W, assumed that the distance between the Zone 2 perimeter berm wells and the sloughs was 300 feet. However, at some locations at the Site this distance is significantly less than 300 feet (at the old barge canal entrance, for example, the distance between the berm and the slough is 0 feet). Also, it is possible that Zone 2 leachate is surfacing in some of the tidal channels in the wetlands between the landfill berm and the sloughs, for which the model does not account. A more conservative modeling effort that accounted for issues such as these may have resulted in a lower predicted concentration reduction range than that predicted by the Respondents.



Analyses of water samples taken from the Site indicate the presence of opportunistic pathogens that are resistant to antibiotics.

## 6.2 ECOLOGICAL EVALUATION

The ecological evaluation in the Streamlined Risk Assessment selects or develops comparison numbers that represent concentration levels considered to be protective of ecological receptors, and then compares site-specific data results to the comparison numbers. In general, comparison numbers include established standards, criteria, and risk-based concentrations. Various media on and near the landfill, including surface water, ground water, surface soil, subsurface soil, leachate seeps, surface sediment, and subsurface sediment, were sampled during the Remedial Investigation. The Streamlined Risk Assessment compares these sample results to the comparison numbers, and site data exceedences of the comparison numbers are summarized and reported.

The Streamlined Risk Assessment selects or develops comparison numbers that are considered to be protective of ecological receptors in the vicinity of Tulalip Landfill. Comparison numbers for sediments are equivalent to the Washington State Sediment Management Standards. The sediment comparison numbers are dry-weight normalized Apparent Effects Threshold (AET) concentrations which, if normalized for organic carbon, are equivalent to the Sediment Management Standards. AETs are used because Site data were reported on a dry weight basis, and, on a dry-weight basis, AETs are equivalent to the Washington State Sediment Standards (Chapter 173-204 WAC).

For surface water, groundwater, and leachate discharges, the Streamlined Risk Assessment selects comparison numbers that are considered protective of aquatic life.<sup>24</sup> The federal criteria developed under the authority of the Clean Water Act (CWA) Section 304(a) are designed to protect all water bodies across the nation. In addition, these or more stringent criteria have been adopted as standards by Washington State.

For a given chemical, the most conservative of the State standard or the federal criterion has been selected as the comparison number. Application of freshwater versus marine comparison numbers is based on the salinity of the receiving water body and the types of plant and animal communities present.

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<sup>24</sup> Relatively recent changes to the National Toxics Rule were published after development of the Streamlined Risk Assessment. However, these National Toxics Rule changes would not have significantly changed the results of any analyses, and would not have changed any conclusions, in the Streamlined Risk Assessment.



For example, data from on-source pooled water and leachate seep SP-01 were compared to the more stringent of:

- Washington State acute and chronic fresh Water Quality Standards (Ecology, 1992)
- Federal acute and chronic freshwater Ambient Water Quality Criteria (AWQC) (EPA, 1992b)

Data from off-source surface water, groundwater, and perimeter berm leachate seeps discharging directly to off-source wetlands were compared to the more stringent of:

- Washington State acute and chronic marine Water Quality Standards (Ecology, 1992)
- Federal acute and chronic marine Ambient Water Quality Criteria (AWQC) (EPA, 1992b)

Comparison numbers used in the ecological evaluation for specific contaminants in specific media are provided in Table 6-3.<sup>25</sup>

The Streamlined Risk Assessment compared site data to the comparison numbers. Chemicals exceed the comparison numbers in samples taken from on-source surface water, on-source soil, Zone 1 groundwater, Zone 2 groundwater, leachate discharging through the perimeter berm leachate seeps, off-source surface soil, off-source subsurface soil, off-source surface water, off-source surface sediment, and off-source subsurface sediment. Tables 6-4 and 6-5 summarize the chemicals found in these on-source and off-source media at the Site that exceed the ecological comparison numbers, and also provide information regarding the frequency of the exceedences.

Chemicals measured at levels at least ten times higher than the ecological comparison numbers include pesticides (4,4'-DDT, heptachlor epoxide, and aldrin), PCBs (Aroclor 1016 and Aroclor 1232), copper, cyanide, endrin, lead, mercury, zinc, nickel, chromium, acenaphthene, naphthalene, fluorene, and 2-methylnaphthalene.

Chemicals found in off-source wetland soils near six of the leachate seeps exceed comparison numbers, and chemicals exceed comparison numbers in subsurface soils at five of the six leachate seeps tested. Chemicals found in leachate exceeded comparison numbers at least once in most of the eleven seeps that were tested. Chemicals exceeding comparison numbers in Zone 1

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<sup>25</sup> AWQC calculations in the interim ROD Tables are based on a pH of 7.8 and hardness of 100 ppm CaCO<sub>3</sub>, which are within ranges that have been measured at the Site.



ground water included total metals (copper, lead, nickel, and zinc), and ammonia nitrogen, total cyanide, and heptachlor epoxide.

The RI/FS approach for evaluating Zone 2 ground water was to measure ground water chemical concentrations at 13 perimeter landfill berm monitoring wells. Ground water samples taken directly from the Zone 2 monitoring wells showed that total metals (copper, lead, chromium, and nickel), total cyanide, and ammonia nitrogen exceeded surface water comparison numbers in many of the samples. Based on this data from the berm wells, the Respondents used a ground water modeling technique to predict the degree of contaminants dilution that would be expected between the berm wells and the location where Zone 2 ground water enters the sloughs, which according to State law is where State water quality standards must be applied. The results of the Respondents' ground water modeling indicated that, in general, one would expect contaminants in the berm wells to be diluted by a factor of 5 to 9 by the time they reached the sloughs. Assuming a concentration reduction at the low end of the range predicted by the modeling, 5 times, the following contaminants would be expected to exceed the ecological comparison numbers at the location where Zone 2 ground water enters the sloughs:

<u>Chemical</u>	<u>Frequency of Exceedances</u>
Cyanide - total	1/13
Nickel - total	7/73
Nickel - dissolved	2/26
Ammonia Nitrogen	73/73

Assuming a concentration reduction at the high end of the range predicted by the modeling, 9 times, the following contaminants are predicted to exceed the ecological comparison numbers at the location where Zone 2 ground water enters the sloughs:

<u>Chemical</u>	<u>Frequency of Exceedances</u>
Cyanide - total	1/13
Nickel - total	1/73
Ammonia nitrogen	73/73

Based on this evaluation, and if the concentration reduction factor predicted by the modeling (5 to 9 times) between the berm wells and the Zone 2/slough interface is assumed,<sup>26</sup> the contaminants listed above would be expected to exceed the ecological comparison numbers at the location where Zone 2 discharges to surface water.

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<sup>26</sup> See footnote 19.



Figure 6-2 is a map of the Site that shows sampling locations where the most significant site data exceedances of the ecological comparison numbers occur. Sample data at the locations shown in this Figure exceed the comparison numbers by at least an order of magnitude.

### 6.3 ASSESSMENT OF SITE

The results of the Streamlined Risk Assessment indicate that there are a significant number of exceedances of human health and ecological comparison numbers in most of the media at the Site. Exceedances were found in leachate, surface water, ground water, soils, and sediments at the Site. These exceedances indicate the potential for adverse effects to people that use the Site, and to animals and plants that live on or near the landfill and come into contact with these media. The RI data establishes a clear link between contamination leaving the landfill and that found in adjacent areas. Many of the chemicals that exceeded comparison numbers in soil and sediment samples taken near the landfill leachate seeps were also detected in leachate seeping from the landfill surface and berm. EPA does not consider ecological risks as having adverse implications only for the environment. Ecological risks also impact human health.

Site data that exceed the chemical comparison numbers, which are considered to be protective of plants, mammals, and aquatic organisms, indicate that many plants and organisms may be at risk from exposure to hazardous substances at the Site. See Streamlined Risk Assessment pages 4-9 and 4-10, and Appendix A. Soil concentrations that are toxic to plant life indicate that the more sensitive plant species, and animals such as field mice and waterfowl that feed on them, may be adversely affected. Increased mortality to plants also indicates that the natural cycle of nutrients within the wetland may be altered. Such exceedances may present threats not only to these types of plants and organisms but also animal predators higher on the food chain, such as hawks, eagles, and salmon. Some chemicals, such as DDT and PCBs, tend to increase in concentration as they move up the food chain, and may represent higher risks for predators. For example, shrews may become contaminated from ingesting earthworms that live in contaminated soils. If field mice and shrews die as a result of the contamination, then predators lose them as a food source. If the field mice and shrews accumulate contaminants but don't die, their predators may be at risk from elevated contaminant concentrations in their food supply.

The presence of these chemicals at concentrations above the comparison numbers indicates that there are releases of hazardous substances that pose actual or potential threats to animal and plant life in the wetland areas around Tulalip Landfill. In addition, data collected during the RI show the presence of chemicals of concern (for example, cadmium, chromium, and nickel)



in sculpin (a species of fish) found in the tributaries surrounding the Site. Wetlands are considered sensitive habitats and are protected under the Clean Water Act. They have attained national recognition as critical areas for important ecological functions such as avian roosting, feeding, and breeding; fish and invertebrate nurseries; nutrient import and export; flood control; and sediment trapping. Wetland areas serve as critical habitat to animals during the sensitive life-stages of reproduction and rearing. Many kinds of birds such as waterfowl, shorebirds, eagles and falcons use the wetland areas surrounding Tulalip Landfill for feeding and rearing of young. (Estuarine and marine fish and invertebrate species use wetland areas for reproduction and rearing of juveniles; therefore, more sensitive life-stages are likely to be present during certain periods of the year). It is important to ensure these sensitive life-stages are protected from stress in the form of chemical contamination or deterioration of habitat quality.

In addition to the importance of protecting the estuary wetlands from potentially harmful concentrations of chemicals that exceed the comparison numbers, it is also important to reduce the total loading of contaminants from the landfill to the estuary. When contaminants leave the landfill they enter the nearby ecosystems which include wetlands and sloughs. Contaminants in the leachate seeps (accounting for approximately 5-35% of the leachate leaving the landfill) are also found in the media surrounding the landfill, strongly indicating a transport pathway from the landfill to the nearby ecosystems. The strongest indication of movement of bioaccumulative contaminants from the seeps to surrounding media comes from leachate seep locations SP08 (for DDT) and SP09 (for PCBs).

Similarly, contaminants found in the ground water within the landfill are most likely moving with the ground water into the surrounding ecosystems (estimated as about 65% to 95% of the total leachate transport). Like the leachate seep contaminants, these ground water contaminants can accumulate in sediments as the ground water contacts the nearby surface waters (tributaries, tidal creeks, and the sloughs). Based on the exceedances of comparison numbers in Zone 2 ground water in the berm wells and predicted through ground water modeling at the sloughs, it is appropriate to conclude that discharges from the landfill are resulting in exceedances of human health and ecological comparison numbers at the location where Zone 2 ground water discharges to surface water, which represents a potential threat to human health and the environment.

Based on the RI ground water modeling, chemicals of concern at the location where Zone 2 ground water discharges to the sloughs include arsenic (for human health); and cyanide, nickel, and ammonia (for ecological receptors). EPA notes that ammonia nitrogen (i.e., ammonia) exceeds comparison numbers in all



samples taken at the high end of the predicted concentration reduction range (73 of 73). Based on the loading rate estimates provided in RI Table 5-14, the yearly discharge rate of ammonia from the entire Site would be approximately 2971 lbs., or about 1.5 tons. Approximately 65% to 95% of the total leachate at the Site discharges through Zone 2, so the contribution from the Zone 2 wells would be in range of 1931 lbs. to 2822 lbs. (1 to 1.5 tons) per year.

Although dilution of dissolved or suspended material and contaminants will undoubtedly occur as leachate or ground water moves away from the landfill, there is significant potential for several classes of contaminants to associate with organic material and other particles, accumulate in sediments, and become incorporated into the food webs in the ecosystems surrounding the landfill. Of particular concern, because of extremely well-documented information elsewhere, are persistent and bioaccumulative contaminants such as DDT (and other historical pesticides), PCBs, and metals.

The predicted toxicity of contaminants in the leachate seeps and groundwater has been evaluated using standard approaches (comparison with available standards, criteria, risk-based levels, etc.). Existing data show clear indications of toxicity from landfill sources. At leachate seeps in particular, DDT and two PCB Aroclors (1016 and 1232) had exceedences of 13-49, 16-40, and 33-194 times the ecological water quality criterion, respectively. These consistent, high level exceedences underscore the concern that the leachate seeps represent an ongoing source that loads these persistent and bioaccumulative contaminants into the surrounding ecosystems. Of similar concern is mercury, which had concentrations in the leachate up to 15 times the water quality criterion. Even though these concentrations are likely to decrease with distance from the seep source, constant loadings could maintain the presence of these compounds in the surrounding off-source media.

One reason the landfill poses a problem for its surroundings is its relatively large size. The landfill perimeter (approximately 5,300 feet) fronts over 2 miles of off-source, ecologically significant wetlands. The landfill contributes a significant amount of leachate to the estuary, estimated between 26.3 to 188.1 million gallons each year.

For information regarding potential limitations regarding the data use and interpretation, see Streamlined Risk Assessment Section 4.6 - Uncertainty Analysis. Samples taken for the Remedial Investigation show that "reference" wetland areas located a short distance from the landfill have elevated levels of man-made chemicals. EPA's interpretation of these results is that this contamination in off-Site reference areas suggests that the wetlands and sloughs in the vicinity of the landfill are



already at risk from contaminant loading, from sources that may include the landfill. Based on information gathered by EPA over the years at the Site, it is reasonable to conclude that the Tulalip Landfill is a chronic source of contamination to the surrounding estuary. Containment of the landfill source area is expected to reduce chemical loadings to off-source areas.

The nature and extent of contamination at Tulalip Landfill and the associated potential risks as determined from the Streamlined Risk Assessment require remedial action to be taken at the Site. Comparison of the measured Site chemical concentrations to the human health risk-based and ecological effects-based standards and criteria established under other environmental laws, and risk-based chemical concentrations, reveals significant potential risks to humans and the environment. Based on the RI/FS and findings in the Streamlined Risk Assessment, EPA finds that actual or threatened releases of hazardous substances from the Site, if not addressed by the selected alternative, may present an imminent and substantial endangerment to public health, welfare, or the environment. The qualitative risk information provided in the Streamlined Risk Assessment demonstrates that remedial action is necessary to stabilize the site and to prevent further degradation of off-source areas as a result of chemical discharges from the Site.

Based on the microbial data collected from the Site, EPA concluded in the Streamlined Risk Assessment that "microbial contamination at the site may pose a potential risk to humans."

#### **7.0 CLEANUP OBJECTIVES FOR THE INTERIM REMEDIAL ACTION**

Based on the results of the RI and the Streamlined Risk Assessment, the extent of contamination at the Site includes the following:

- the waste placed in the landfill, including part or all of the landfill berm; Zone 2 ground water within the waste mass;
- leachate exiting the berm through seeps and discharging to the wetlands and tidal channels adjacent to the landfill;
- the landfill surface, including surface soils, pooled water on the landfill surface and at least one leachate seep on the landfill surface;
- Zone 2 ground water beneath the waste mass that moves beneath the adjacent wetlands and discharges directly into the sloughs and possibly the tidal channels;
- sediments and soils adjacent to the landfill; and



- fish that live near the landfill.

The purpose of establishing Remedial Action Objectives (RAOs) is to help ensure that the selected remedial action will be protective of human health and the environment by effectively containing waste at the Site and to minimizing exposure of humans and ecological receptors to Site contaminants. The RAOs for the interim remedial action are:

Zone 1 leachate: Eliminate migration of leachate that exceeds surface water ARARs from, through, and under the source area berm;

Soil/landfill contents/on-source surface water: Prevent direct contact with, and ingestion of, landfill contents, contaminated soils, and contaminated surface water on the landfill surface;

Minimize infiltration: Minimize infiltration into the landfill wastes and resulting contaminant leaching to ground water.<sup>27</sup>

Zone 2 ground water: Minimize migration of contaminated ground water at levels exceeding surface water ARARs, and prevent use of contaminated ground water;

Stormwater runoff and erosion: Prevent detrimental impact to adjacent off-source wetlands and surface water bodies due to stormwater runoff from the landfill cap surface;

Landfill gas: Prevent inhalation and release of landfill gas exceeding ambient air standards established by the Puget Sound Air Pollution Control Authority (PSAPCA). Manage landfill gas to prevent stress on a cap system;

Wetlands: Minimize loss of off-source wetlands, and mitigate for any destruction of or damage to off-source wetlands from the remedial action;

Future land use: Provide final surface conditions suitable for all season subsistence (i.e., hunting and fishing), recreational, and light industrial and commercial use.

The point of compliance for Zone 1 ground water (i.e., the leachate seeps) shall be the point at which leachate exits the exterior face of the perimeter landfill berm. The point of

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<sup>27</sup> Inclusion of this RAO is recommended by EPA guidance. See Presumptive Remedy for CERCLA Municipal Landfill Sites (EPA 540-F-93-035, September 1993), page 5.



compliance for Zone 2 ground water shall be the location where Zone 2 ground water discharges to surface water.

## 7.1 SUMMARY OF MAJOR APPLICABLE REQUIREMENTS

This section and the following section (Section 7.2) summarize some of the major applicable or relevant and appropriate requirements ("ARARs") that have been identified as part of the analysis of the proposed alternatives. This section summarizes requirements that are "applicable" to the interim remedial action, and Section 7.2 summarizes requirements that are "relevant and appropriate." A more detailed discussion and analysis of these and other ARARs, including explanation of why these requirements are applicable or relevant and appropriate, is provided in Section 11.2 of this ROD. However, these ARARs are presented here in summary fashion in order to assist the reader with the discussions contained in the "Description of Alternatives" and the "Summary of the Comparative Analysis of Alternatives" sections of this interim action ROD. The following requirements are applicable to the interim remedial action:

### Section 402 of the Clean Water Act ("CWA") -- 33 U.S.C. § 1342

Normally, any sort of action that results in dredging or filling wetlands is governed by Section 404, not 402, of the CWA. However, in November 1984, the U.S. Army Corps of Engineers informed the Tulalip Tribes of the Corps' decision that the landfill capping activities that the Tribes were undertaking in the 1980's would fall under the authority of Section 402 of the CWA, not Section 404. Thus, for the on-source area of the landfill, Section 402 is the ARAR under the CWA, not Section 404.

Section 402 of the CWA established the NPDES permit program, which governs direct discharges from point sources. The NPDES permit regulations contain provisions for discharge limitations, monitoring requirements, and best management practices. Because this interim action is being conducted entirely on-site, Section 121(e) of CERCLA does not require that a NPDES permit be issued to cover these on-site discharges. However, this interim action will meet all substantive requirements of the NPDES permit program for any on-site discharges.

### Section 404 of the Clean Water Act -- 33 U.S.C. § 1344

Section 404 of the CWA regulates the discharge of fill material into the waters of the U.S., including wetlands. Section 404 is relevant and appropriate for the off-source areas of the Site. The guidelines for this program are set forth in 33 C.F.R. Parts 320 through 330 and 40 C.F.R. Part 230, and are established to ensure that proposed discharges are evaluated with respect to impacts on aquatic ecosystems.



Clean Air Act (42 U.S.C. §§ 7401 et seq.) -- National  
Primary and Secondary Ambient Air Quality Standards, 40  
C.F.R. Part 50

These regulations govern emissions of particulates and certain priority pollutants to the air from on-site sources. Remedial actions that would result in air emissions will be designed to meet federal air quality standards.

**7.2 SUMMARY OF MAJOR RELEVANT AND APPROPRIATE REQUIREMENTS**

The following summarizes some of the major requirements that are relevant and appropriate for the interim remedial action:

Federal Water Pollution Control Act/Clean Water Act --  
33 U.S.C. §§ 1251-1376; 40 C.F.R. Parts 100-149

These statutes and their implementing regulations govern discharges of water and wastewater to sewers, surface water, and site runoff that is directed to a water body subject to the Acts. They establish point source standards for discharges into surface water bodies under the National Pollutant Discharge Elimination System ("NPDES"). They also establish ambient water quality criteria ("AWQC") for the protection of aquatic organisms and human health.

Washington State Model Toxics Control Act ("MTCA") --  
RCW Chapter 70.105D; WAC Chapter 173-340

The State of Washington MTCA contains numerical cleanup standards for groundwater, surface water, soils, air, and sediments. The MTCA regulations that pertain to the Tulalip Landfill are the groundwater and surface water cleanup standards contained in WAC 173-340-720 and -730. These regulations are relevant and appropriate for groundwater and "surface waters of the state" that are affected or potentially affected by a release of a hazardous substance to those waters.

State of Washington Water Pollution Control Act/Water  
Resources Act -- Chapters 90.48 and 90.54 of the  
Revised Code of Washington ("RCW"); Water Quality  
Standards for Surface Waters -- Chapter 173-201A WAC

These statutes, through their implementing regulations, require the use of all known available and reasonable technologies in the treatment of wastewater prior to a release or discharge of such wastewater into waters of the State. These statutes do not contain any numerical criteria or standards. However, the WAC 173-201A regulations implement the federal requirement that the state develop a water quality control plan. These regulations contain both narrative and quantitative limitations for protection of surface waters by regulating



discharges to sewers and surface waters, and establish discharge limits for water quality parameters and toxic substances.

Federal Solid Waste Municipal Landfill Requirements -- 40 C.F.R. Part 258

These relevant and appropriate regulations require that landfills be closed to meet certain performance standards governing surface slopes, landfill cover construction, and revegetation.

Minimal Functional Standards ("MFS") for Solid Waste Handling, WAC Chapter 173-304

These relevant and appropriate regulations require that landfills be closed to meet certain performance standards governing surface slopes, landfill cover construction, and revegetation.

Washington State Clean Air Act (R.C.W. 70.94); Puget Sound Air Pollution Control Authority ("PSAPCA") Regulations I and III

These regulations govern emissions of particulates and certain priority pollutants to the air from on-site sources. The state Clean Air Act and PSAPCA regulations are relevant and appropriate requirements which would ensure that emissions from the interim remedial action will be performed in compliance with the substantive requirements of a PSAPCA permit. However, on-site actions will not require a PSAPCA permit.

The PSAPCA Guidelines For Acceptable Ambient Levels ("AALs") are not ARARs because they are non-promulgated guidance, but instead are guidelines "to be considered" ("TBC") when implementing the selected remedy. The AAL guidelines specify that actions producing air emissions must meet the guidelines. They are used to help implement PSAPCA Regulation III, which governs releases of toxic air pollutants.

## 8.0 DESCRIPTION OF ALTERNATIVES

The Source Area Containment Feasibility Study (FS) identified and evaluated containment alternatives that could be used to address threats and potential threats posed by the Site for the Interim Remedial Action. In addition, the Respondents have submitted several alternatives that were not included in the FS and which are discussed below. As discussed in Section 4.0, EPA has prepared the *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*, September 1993, which provides an evaluation of 30 CERCLA landfill FS reports, and has been included in the Administrative Record for this interim ROD. The Feasibility Study Analysis summarizes the initial identification



and screening technologies used in the selection of landfill remedies at the identified CERCLA sites as further support for the identification and screening of technologies and development of alternatives in the Source Area Containment FS for the Tulalip Landfill.

#### **Common Elements**

With the exception of the "No Action" alternative, all of the alternatives would include some form of:

- institutional controls, such as land use restrictions that limit or prohibit development or activities conducted on the Site so as to not interfere with performance of the selected remedy, and to prohibit activities that are not protective of human health and the environment (e.g., prohibit any drilling or other excavation through any layer of the cover system that may interfere with the performance of the remedy, and set weight restrictions and weight distribution restrictions for loads that can be placed on the cover);
- a monitoring plan to measure the effectiveness of the remedy and ensure that the remedy remains protective of human health and the environment; and
- a plan for conducting operation and maintenance (O&M).

All "present worth" costs shown below include capital costs and operation and maintenance over a 30-year period, calculated with a discount rate of 5%. Actual costs are predicted to fall within a range of +50 per cent to -30 per cent of cost estimates.

For the geosynthetic cover alternatives that don't include ground water extraction from the deeper Zone 2 aquifer, a common element is that no action would be taken to collect or treat the ground water in Zone 2. For all of the capping alternatives, "clean" runoff water would be discharged to the tidal channels or sloughs surrounding the landfill at a rate and in a manner that will prevent harm to the off-source wetlands.

The alternatives evaluated for addressing the environmental problems are:

#### **8.1 ALTERNATIVE 1 - NO ACTION**

Annual Monitoring Cost: \$63,000  
Total Cost Estimate: \$1,030,000

The Superfund program requires that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, EPA would take no further action at the Site to prevent exposure to contaminants,



or to prevent the migration of contaminants. The cost estimate above assumes that there would be some monitoring of the leachate seeps and ground water at the Site.

## **8.2 ALTERNATIVE 2 - ACTIVE LEACHATE SEEP INTERCEPTION AND TREATMENT**

Construction Cost: \$2,500,000  
Annual O&M Cost: \$ 220,000  
Total Cost Estimate: \$5,900,000

Estimated Construction Timeframe: 2 years

Leachate in the Zone 1 ground water that is migrating to the surface through the perimeter landfill berm would be collected and treated. To intercept the leachate, a drainage trench would be built around the landfill. The trench would extend from the surface of the landfill near the perimeter to the bottom of the waste. The trench would be filled with a porous material to collect leachate before it discharges to the surrounding wetlands.

Approximately 24 extraction wells installed around the perimeter within the trench would extract the leachate. The leachate would either be sent to a nearby wastewater treatment plant, or an on-site treatment system would be built. If an on-site treatment system were built, the costs would be significantly higher than the estimate provided above. It is not anticipated that off-source wetlands would be adversely impacted by construction of this alternative.

## **8.3 ALTERNATIVE 2b - LEACHATE COLLECTION WITH TREATMENT BERM**

Alternative 2b was developed by the Respondents and submitted to EPA for consideration subsequent to approval by EPA of the Source Area Containment Feasibility Study. The Respondents' submittal describing this alternative (Development and Evaluation of the Treatment Berm Alternative, June 30, 1995) is included in the administrative record for this interim remedy.

Respondents Construction Cost: \$11,300,000  
Respondents Annual O&M Cost: \$ 129,000  
Respondents Total Cost Estimate: \$13,300,000

EPA Construction Cost: \$18,000,000  
EPA Annual O&M Cost: \$ 179,000  
EPA Total Cost Estimate: \$21,300,000

Estimated Construction Timeframe: 2 years

This alternative is similar to Alternative 2, except that it includes additional collection trenches across the center of the



landfill, and it would pass the landfill leachate through two earthen berms before releasing the leachate to the sloughs. One of these berms would be located in the mouth of the old barge canal, and the other would be constructed on the southern edge of the landfill. The Respondents predict that water leaving the berms would meet water quality cleanup goals as a result of dilution (leachate mixing with slough water), and natural treatment processes such as chemical and biological degradation of contaminants within the berm.

In addition to the perimeter collection system in Alternative 2, collection trenches would also be constructed transecting the landfill surface. The purpose of the additional trenches is to reduce the leachate mound in the center of the landfill, thereby reducing the flow of leachate down into the deeper Zone 2 ground water and out into the sloughs.

The proposed collection system and berm treatment system are unproven technologies that have never been used to control leachate generated by a landfill like Tulalip Landfill. Based on EPA's review of information submitted by the Respondents on this alternative, EPA concluded that the Respondents significantly underestimated the cost of this alternative, given the level of uncertainty involved with the proposed technology. EPA has developed a separate cost estimate for this alternative. Both cost estimates are provided above for comparison.

A traditional, on-site treatment system could also be built to accept the leachate. If an on-site treatment system were built, the costs would be significantly higher than the estimate provided above. The Respondents estimate that 2.8 acres of off-source wetlands would be adversely impacted or lost in order to construct the proposed treatment berms.

#### **8.4 ALTERNATIVE 2b(ii) - LEACHATE SEEP COLLECTION WITH DISCHARGE TO PUBLICLY OWNED TREATMENT WORKS (POTW)**

At the October 3, 1995, public meeting, a variation of Alternative 2b was described. In a submittal dated October 24, 1995, more detailed information regarding this variation of Alternative 2b was provided to EPA by the Respondents for consideration during the public comment period on the Proposed Plan. This submittal is available in the administrative record for this interim remedy.

Respondents Construction Cost:	\$ 5,900,000
Respondents Annual O&M Cost:	\$ 386,000
Respondents Total Cost Estimate:	\$11,800,000



EPA Construction Cost: \$13,600,000  
EPA Annual O&M Cost: \$ 465,000  
EPA Total Cost Estimate: \$20,800,000

Estimated Construction Timeframe: 2 years

Alternative 2b(ii) uses the same basic leachate collection system as Alternative 2b, with some modifications,<sup>28</sup> but instead of sending the leachate through treatment berms, the leachate would be sent to an off-site sewage treatment plant, also commonly referred to as a Publicly Owned Treatment Works (POTW). The submittal proposes to collect approximately 58 million gallons of leachate per year and send it to either the Marysville or Everett POTW, where it would be treated along with other effluent streams received by the POTW. For purposes of clarifying discussion in this Record of Decision, to differentiate this version of alternative 2b from the Treatment Berm version described above, the POTW discharge version shall be referred to henceforth as "Alternative 2b(ii) - Leachate Seep Collection with Discharge to POTW". It is not anticipated that any off-source wetlands would be adversely impacted by construction of this alternative.

#### **8.5 ALTERNATIVE 3 - LEACHATE SEEP AND GROUND WATER COLLECTION AND TREATMENT**

Construction Cost: \$12,400,000  
Annual O&M Cost: \$ 620,000  
Total Cost Estimate: \$22,000,000

Estimated Construction Timeframe: 2 years

Shallow leachate and deeper, contaminated ground water from the landfill would be collected and treated. To minimize the leachate and ground water migrating away from the landfill, and to minimize the amount of uncontaminated ground water that could be pulled in by the pumping system, a "slurry wall" would be constructed underground around the waste. A slurry wall is an wall of low permeability made of clay that is constructed inside a deep, narrow trench. The slurry wall would completely surround the on-source area of the Site. Approximately 24 extraction wells would be installed inside the slurry wall to extract the leachate.

The leachate would be sent to a POTW, or an on-site treatment system would be built. If an on-site treatment system needed to be built, the costs would be significantly higher than

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<sup>28</sup> The concept for the leachate collection system remains basically the same as with Alternative 2b, with the addition of some pumps to help move the leachate through the collection trenches, and some additional sumps.



the estimate provided above. It is not anticipated that any off-source wetlands would be adversely impacted by construction of this alternative.

#### **8.6 ALTERNATIVE 4a - SOIL COVER WITH PASSIVE DRAINAGE**

Construction Cost: \$19,500,000  
Annual O&M Cost: \$ 170,000  
Total Cost Estimate: \$22,100,000

Estimated Construction Timeframe: 2 years

A low hill with a minimum 2% slope would be constructed on the landfill, which would allow rain water to run off the cover under the force of gravity ("passive drainage"). The landfill would be covered with approximately two feet of clay, which would reduce the amount of rainwater going into the landfill. A protective layer of soil would be placed over the clay layer to protect it.

Ground water modeling conducted by the Respondents during the RI indicates that this alternative would reduce, but not eliminate, the perimeter leachate seeps. It would also reduce the amount of contaminated deeper ground water migrating into the sloughs, but to a lesser extent than the geosynthetic cover alternatives. The cover would prevent contact with contaminants on the landfill surface. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.

#### **8.7 ALTERNATIVE 4b - GEOSYNTHETIC COVER WITH ACTIVE DRAINAGE**

Respondents Construction Cost: \$15,600,000  
Respondents Annual O&M Cost: \$ 190,000  
Respondents Total Cost Estimate: \$18,600,000  
  
+ EPA Gas Treatment Contingency: \$ 2,700,000  
EPA Total Cost Estimate: \$21,300,000

Estimated Construction Timeframe: 2 years

The Site would be graded into a "waffle" pattern, with rain water flowing into many depressions on the surface of the cover. A geosynthetic cover would be installed over this waffle pattern. This geosynthetic cover would basically consist of a single barrier layer, which would be either a type of thick plastic, or a manufactured clay-type sheet product. Twelve inches of clean topsoil would be placed on top of the geosynthetic cover and planted with vegetation to reduce erosion and protect the low permeability layer.



This alternative is less expensive in the short term because the landfill would remain relatively flat (i.e. fill material would not be brought on-site to create a low hill with a 2% slope that would passively drain rain water off of the cover). Rather, a system of pipes and pumps would be installed to pump rain water out of the depressions ("active drainage").

EPA's higher cost estimate for this alternative reflects the possibility that a landfill gas treatment system may be necessary under this type of cover, which is less permeable than a soil cover.

Based on the results of groundwater modeling conducted during the RI/FS, this alternative would substantially reduce infiltration of rain water through the waste, thus minimizing the potential for generation and migration of new leachate. This alternative would be expected to eliminate the perimeter berm leachate seeps within two years, and would substantially reduce migration of leachate into Zone 2. The cover would also prevent contact with contaminants on the landfill surface. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.

#### **8.8 ALTERNATIVE 4c - GEOSYNTHETIC COVER WITH PASSIVE DRAINAGE**

Respondents Construction Cost:	\$19,800,000
Respondents Annual O&M Cost:	\$ 170,000
Respondents Total Cost Estimate:	\$22,400,000

+ EPA Gas Treatment Contingency:	\$ 2,700,000
<b>EPA Total Cost Estimate:</b>	<b>\$25,100,000</b>

Estimated Construction Timeframe: 2 years

This alternative would include the same actions as Alternative 4b but with passive drainage. The Site would be graded, and fill would be brought to the Site to construct a low hill with a minimum of a two percent slope, over which a geosynthetic cover would be installed. This geosynthetic cover would basically consist of a single barrier layer, which would be either a type of thick plastic, or a manufactured clay-type sheet product. Twelve inches of clean topsoil would be placed on top of the geosynthetic cover and planted with vegetation to reduce erosion and protect the low permeability layer. EPA's higher cost estimate for this alternative reflects the possibility that a landfill gas treatment system may be necessary.

This alternative is expected to minimize the infiltration of surface water into the waste contents of the landfill. The effect of the low permeability cover will be to significantly decrease the levels of contaminated leachate within the landfill waste. As a result, the low permeability cover will eliminate



the release of leachate from seeps at the surface and the perimeter of the landfill, and minimize the migration of contaminated water from the landfill through the deeper Zone 2 ground water aquifer to the sloughs.

Based on the results of groundwater modeling conducted during the RI/FS, this alternative would minimize infiltration of rain water through the waste, thus minimizing the potential for generation and migration of new leachate. This alternative would be expected to eliminate the perimeter berm leachate seeps within two years, and would minimize migration of leachate into Zone 2. The cover would also prevent contact with contaminants on the landfill surface. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.

#### **8.9 ALTERNATIVE 4d - COMPOSITE COVER WITH PASSIVE DRAINAGE**

Respondents Construction Cost:	\$24,000,000
Respondents Annual O&M Cost:	\$ 200,000
Respondents Total Cost Estimate:	\$27,100,000
+ EPA Gas Treatment Contingency:	\$ 2,700,000
<b>EPA Total Cost Estimate:</b>	<b>\$29,800,000</b>

**Estimated Construction Timeframe: 2 years**

A composite cover has two low permeability layers instead of just one. Usually a composite cover combines a thick plastic liner with a layer of clay. Composite covers usually develop fewer leaks over time, because one layer can fail and the second layer will still be effective in minimizing infiltration. Although composite covers generally perform better over time than single-layer covers, they are more expensive.

Based on the results of groundwater modeling conducted during the RI/FS, this alternative would minimize infiltration of rain water through the waste, thus minimizing the potential for generation and migration of new leachate. This alternative would be expected to eliminate the perimeter berm leachate seeps within two years, and would minimize migration of leachate into Zone 2. The cover would also prevent contact with contaminants on the landfill surface. EPA's higher cost estimate for this alternative reflects the possibility that a landfill gas treatment system may be necessary. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.



#### **8.10 ALTERNATIVE 5: GEOSYNTHETIC COVER WITH LEACHATE SEEP CONTROL**

Respondents Construction Cost:	\$22,200,000
Respondents Annual O&M Cost:	\$ 220,000
Respondents Total Cost Estimate:	\$25,600,000

+ EPA Gas Treatment Contingency:	\$ 2,700,000
<b>EPA Total Cost Estimate:</b>	<b>\$28,300,000</b>

Estimated Construction Timeframe: 2 years

The Site would be graded, and fill would be brought to the Site to construct a low hill with a minimum of a two percent slope, over which a geosynthetic cover would be installed. This geosynthetic cover would basically consist of a single barrier layer, which would be either a type of thick plastic, or a manufactured clay-type sheet product. Twelve inches of clean topsoil would be placed on top of the geosynthetic cover and planted with vegetation to reduce erosion and protect the low permeability layer. An active perimeter leachate seep interception system, such as the one described in alternative 2 above, would be installed.

Based on the results of groundwater modeling conducted during the RI/FS, this alternative would minimize infiltration of rain water through the waste, thus minimizing the potential for generation and migration of new leachate. This alternative would be expected to eliminate the perimeter berm leachate seeps soon after construction, and would minimize migration of leachate into Zone 2. The cover would also prevent contact with contaminants on the landfill surface. EPA's higher cost estimate for this alternative reflects the possibility that a landfill gas treatment system may be necessary. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.

#### **8.11 ALTERNATIVE 6 - GEOSYNTHETIC COVER WITH LEACHATE SEEP AND GROUND WATER CONTROLS**

Respondents Construction Cost:	\$31,700,000
Respondents Annual O&M Cost:	\$ 280,000
Respondents Total Cost Estimate:	\$36,000,000

+ EPA Gas Treatment Contingency:	\$ 2,700,000
<b>EPA Total Cost Estimate:</b>	<b>\$38,700,000</b>

Estimated Construction Timeframe: 2 years

In addition to the actions discussed in Alternative 5, this alternative would also include ground water collection and treatment. The ground water would be collected by constructing a



slurry wall around the Site, and approximately 24 extraction wells would extract the leachate.

This alternative would practically guarantee the elimination of the perimeter berm leachate seeps soon after construction, and would minimize the generation and migration of leachate in the deeper ground water to the sloughs. The cover would prevent contact with contaminants on the landfill surface. In constructing this alternative, approximately 1.7 acres of off-source wetlands would be adversely impacted or lost.

#### 8.12 OTHER ALTERNATIVES

In addition to the alternatives described above, the Respondents proposed two alternatives which EPA considered and appropriately directed the Respondents to exclude from the feasibility study because they are not protective of human health and the environment and do not attain potential applicable or relevant and appropriate requirements (ARARs). One of these alternatives involved placement of a "leachate seep cover" that would cover the landfill berm and would divert the shallow leachate exiting the berm into the deeper ground water zone, where it would migrate to the sloughs. The other alternative involves "passive leachate seep interception", which was a series of 120 drains that would be installed in the waste, and would also theoretically divert the shallow leachate into the deeper ground water, where it would migrate to the sloughs.

Neither of these alternatives would be protective because they would not effectively contain the landfill contaminants. They would allow all of the leachate currently being generated at the Site to continue to discharge into the surrounding environment. They would only change the route the leachate takes to leave the landfill. Because they would not reduce the total loading of contaminants to the off-source area, they do not meet the NCP remedy evaluation criterion for "Overall Protection of Human Health and the Environment." These alternatives would not meet the criterion for "Compliance with ARARs" because they would be expected to worsen existing AWQC exceedences where Zone 2 ground water enters the sloughs. They would not meet "Short-Term Effectiveness" because they would do nothing to reduce total loading of the landfill contaminants to the environment. These alternatives do not meet, or score relatively poorly on, the "Long-Term Effectiveness and Permanence," "Reduction of Toxicity, Mobility, or Volume through Treatment," and "Implementability" criteria. EPA is also seriously concerned that these alternatives would not function as designed in the field, and the Respondents have not brought other landfills where such technologies have been successfully implemented to EPA's attention.



These alternatives are inconsistent with the NCP and with EPA guidance which states that containment of contaminants is appropriate at landfill sites such as the Tulalip Landfill. The alternatives would re-direct visible leachate exiting the landfill berm down into the aquifer where it would be free to enter the environment unseen via the sloughs. These alternatives also are of questionable cost-effectiveness because in EPA's view they offer no real environmental benefit, but their implementation would require substantial monetary expenditures.

The Respondents' proposal for inclusion of these unsuitable alternatives in the Source Area Containment FS was the subject of a formal dispute resolution process under the RI/FS Administrative Order on Consent (AOC). A summary of this dispute is provided in Section 2 of this ROD. Correspondence and EPA's final determination regarding this dispute is included in the Administrative Record for this interim ROD.

#### 9.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

As required by the National Contingency Plan (NCP), EPA used the nine NCP criteria summarized below to evaluate and compare alternatives. An alternative must meet both criteria 1 and 2, known as "threshold criteria," in order to be selected. Criteria 3 through 7, called "balancing criteria," are evaluated to determine which cleanup method provides the best overall solution. After considering public comments on the Proposed Plan, EPA has concluded there is no reason to alter the selected remedy in this interim ROD on the basis of the last two "modifying" criteria.

1. Overall protection of human health and the environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

The alternatives that would be most protective of human health and the environment are:

- 4b Geosynthetic Cover, Active Drainage
- 4c Composite Cover, Passive Drainage
- 5 Geosynthetic Cover, Seep Control
- 6 Geosynthetic Cover, Seep and Zone 2 Ground Water Controls

All of these alternatives would protect human health and the environment in the short and long term by effectively containing the landfill wastes and minimizing the migration of contaminants from the Site through the landfill berms or through the deeper ground water zone. These alternatives meet all the remedial



action objectives (RAOs) which are described in Section 7.0 of this ROD.

Alternatives that are not protective of human health and the environment are:

- 1 No Action
- 2 Active Seep Interception
- 2b Leachate Collection with Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW
- 3 Seep and Zone 2 Ground Water Controls
- 4a Soil Cover, Passive Drainage

The No Action (1), Active Seep Interception (2), and Soil Cover with Passive Drainage (4a) alternatives would not protect human health and the environment because they allow the continued migration of contaminants from the landfill. The No Action (1) and Soil Cover (4a) alternatives would allow the continued release of leachate into surface waters at levels exceeding surface water ARARs, and would fail to attain other RAOs as well. Alternatives 1 and 2 would allow the continued migration of contaminated Zone 2 ground water, and would not prevent contact with landfill contaminants. Alternative 3 would not meet the RAO to minimize infiltration into the landfill waste, and it may not meet the RAO to prevent direct contact with the landfill waste and surface water contamination.

The Leachate Collection with Treatment Berm (2b) Alternative and the Leachate Collection with Discharge to POTW [2b(ii)] Alternative are not considered to be protective of human health and the environment because EPA has significant concerns regarding whether the unproven collection systems proposed for these alternatives, and the unproven Treatment Berm approach proposed for Alternative 2b, would work in the field. There is considerable uncertainty regarding whether Alternative 2b and 2b(ii) would meet many of the RAOs.

There is uncertainty regarding whether the collection systems proposed for the Treatment Berm (2b) or the Discharge to POTW [2b(ii)] alternatives would meet the Zone 1 Leachate RAO, which requires the elimination of leachate that exceed surface water ARARs from, through, and/or under the source area berm. The collection systems proposed for these two alternatives carry significant risk of failure, including the potential for clogging or plugging, and the potential for higher-than-predicted operation and maintenance (O&M) costs due to such problems, and therefore are not considered by EPA to be protective in the long term. These alternatives, as currently configured, may not effectively address exposure to chemical or biological contamination that has been found in water on the landfill surface. These alternatives may not meet the RAO to prevent inhalation and release of landfill gas that exceeds ambient air



standards,<sup>29</sup> and over the long term would not meet the RAO to minimize migration of contaminated ground water to the sloughs. These alternatives would not meet the RAO to minimize infiltration into the landfill.

The Treatment Berm system proposed for Alternative 2b is an unproven technology for a Site like Tulalip Landfill, and EPA has serious concerns that the proposed Treatment Berms would not be effective in the long term, would not reduce risks posed by Site contaminants, and would be relatively impermanent. The Treatment Berms could clog relatively quickly, requiring costly frequent replacement of the berms or a significantly higher level of O&M to maintain flow. EPA is concerned that the unproven Treatment Berms may not "treat" landfill contaminants at all, but merely dilute contaminants with "clean" estuary waters before releasing them to the surrounding environment. If the Treatment Berms were to fail to treat contaminants, implementation of Alternative 2b could worsen existing environmental problems at the landfill by hastening the migration of landfill contaminants into the surrounding estuary, and increasing contaminant loading from the Site to the estuary.

Because Alternative 4b - Geosynthetic Cover with Active Drainage, relies relatively heavily on an active system (i.e., pumps to remove surface water), it also is expected to be less effective in the long term. If the pumping system breaks down or fails to move water off of the cover system quickly, more surface water will tend to penetrate any leaks the capping system. This alternative is also considered to be relatively impermanent because active, mechanical systems employing pumps require a higher level of maintenance than passive systems, and are vulnerable to potential increases in the price of power to run them.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets State and Federal environmental laws, regulations, and other requirements that pertain to the Site or, if not, whether a waiver is justified.

Alternatives that are expected to meet all ARARs set out in Section 11.2 of this interim ROD are:

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<sup>29</sup> Construction of either of these two alternatives could lead to increased landfill gas generation. Gas generation in the landfill is currently at a relatively low level probably because most of the waste is saturated. The collection systems proposed for these alternatives, if they work, would lower the height of the leachate mound in Zone 1, leaving much of the waste unsaturated, and a significant increase in landfill gas generation could result. Neither of these two alternatives provides for collection or treatment of landfill gas.



- 4c Geosynthetic Cover, Passive Drainage
- 4d Composite Cover, Passive Drainage
- 5 Geosynthetic Cover, Seep Control
- 6 Geosynthetic Cover, Seep and Zone 2 Ground Water Controls

These alternatives are expected to achieve surface water ARARs at the landfill berm (see Table 11-1) by eliminating leachate seeps, and at the sloughs by eliminating or minimizing Zone 2 ground water migration. These alternatives also meet Minimum Functional Standards (MFS) requirements promulgated by the State of Washington for closure of solid waste landfills. In the long term, these alternatives are expected to contribute to the achievement of state sediment management standards by ceasing the surface discharge of leachate and minimizing the subsurface discharges of leachate that contribute to contamination of off-source sediments.

The following alternatives do not meet some of the ARARs identified in Section 11.2 of this interim ROD:

- 1 No Action
- 2 Active Seep Interception
- 2b Leachate Collection with Discharge to Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW
- 3 Leachate Seep and Ground Water Collection and Treatment
- 4a Soil Cover, Passive Drainage
- 4b Geosynthetic Cover, Active Drainage

The No Action alternative (1) would not meet surface water ARARs at the leachate seeps nor where Zone 2 ground water discharges to the sloughs. Active Seep Interception (2) would not meet surface water ARARs where Zone 2 ground water discharges to the sloughs. The Soil Cover (4a) is not expected to meet surface water ARARs at either the seeps nor the sloughs, and would not meet the MFS requirements for closure of landfills.

Alternatives 1, 2, 2b, 2b(ii), and 3 do not comply with MFS because they do not include a landfill cover. Alternative 4b, Geosynthetic Cover with Active Drainage, does not comply with MFS because this alternative includes numerous drainage ditches that are less than a 2% slope. Because these alternatives do not meet the MFS ARAR, in order to select any of these alternatives, a waiver of the MFS requirements would have to be invoked, pursuant to 40 C.F.R. 300.430(f)(1)(ii)(C), or EPA would have to find that these minimum specifications for closing landfills are either not relevant or not appropriate at this Site.

In addition, the Leachate Collection with Treatment Berm (2b) alternative may not meet surface water ARARs at the face of the treatment berm if the berm is not effective, and it may not



meet surface water ARARs at the sloughs if the collection system is not effective. Finally, because Alternative 2b requires dredging and filling of off-source wetlands, it may not meet Section 404(b) of the Clean Water Act (CWA), which is an ARAR for the Site. CWA 404(b)(1) requires avoidance of wetland destruction if alternative actions are available. Because there are other containment alternatives which could meet the cleanup objectives that have been identified, EPA may be unable to find that there is no practicable alternative to the dredge and fill, as required by Section 404(b) of the CWA.

The alternatives that EPA has determined meet the two threshold criteria (Alternatives 4c, 4d, 5, and 6) will be carried forward through this analysis and evaluated against the balancing criteria. The alternatives that EPA has determined do not meet both of the NCP threshold evaluation criteria [Alternatives 1, 2, 2b, 2b(ii), 3, 4a, and 4b] will not be carried further through this analysis for evaluation against the other NCP criteria.<sup>30</sup>

3. Long-term effectiveness and permanence considers the ability of an alternative to maintain protection of human health and the environment over time, and the reliability of such protection.

Alternatives that are expected to be permanent and effective in the long term are:

- 4c Geosynthetic Cover, Passive Drainage
- 4d Composite Cover, Passive Drainage
- 5 Geosynthetic Cover, Seep Control
- 6 Geosynthetic Cover, Seep and Zone 2 Ground Water Controls

By effectively eliminating all leachate migration from the Site through the landfill berm and eliminating or minimizing leachate migration through the deeper Zone 2 ground water, and by preventing contact with the landfill wastes, these alternatives are expected to effectively contain the landfill wastes and result in no significant residual risk from the source area. These are technologies that have been implemented at hundreds of sites across the country and are known to be relatively effective in the long term. Alternatives 4c and 4d are relatively passive systems (i.e. relatively little need for an outside power source

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<sup>30</sup> It is inappropriate to carry Alternatives 1, 2, 2b, 2b(ii), 3, 4a, and 4b further through the NCP criteria evaluation because none of these alternatives meet the threshold criteria. However, it should be noted that, in general, these alternatives also compare poorly against the NCP balancing criteria as well as the threshold criteria. A summary of how EPA would evaluate Alternatives 2b, 2b(ii), 3, and 4b in relation to the balancing criteria is provided in Appendix A of this interim ROD.



or treatment plant), which increases their permanence and decreases the costs of long-term operation and maintenance of the remedy. Alternatives 5 and 6 are considered to be somewhat less permanent than Alternatives 4c and 4d because they are not passive systems.

4. Reduction of toxicity, mobility, or volume through treatment evaluates an alternatives's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of residual contamination remaining.

Alternative 6 - Cover, Seep and Zone 2 Ground Water Controls, is expected to effectively treat Site contaminants. This alternative would collect and treat the leachate generated by the Site and send it to an off-site sewage treatment plant, or to a treatment plant that would be constructed on-site.

Alternatives 5 - Cover, Seep Control, would partially meet this criterion because it would intercept and treat leachate exiting the perimeter berm, but would not treat the deeper Zone 2 ground water.

Alternatives 4c - Geosynthetic Cover with Passive Drainage, and 4d - Composite Cover with Passive Drainage, are consistent with the presumptive remedy approach of containment of landfill wastes and do not employ any form of treatment.

5. Short-term effectiveness considers how fast the alternative reaches the cleanup goal and the risks the alternative poses to workers, residents, and the environment during construction or implementation of the alternative.

None of these alternatives is expected to pose risk to the surrounding community during construction or implementation because the Site is relatively isolated. Any significant impacts would likely be confined to the immediate vicinity of the Site and would be mitigated.

Each of Alternatives 4c, 4d, 5, and 6 would potentially pose some risk to workers because all involve some excavation and regrading of waste. However, the type of excavation these alternatives would require is relatively common, and it is anticipated that effective measures would be taken to mitigate any potential risk.

Alternatives 4c, 4d, 5, and 6 may have some short-term adverse impact on the environment during implementation or construction. These capping alternatives would require importing fill material to bring the landfill surface up to the 2% minimum



grades required by MFS.<sup>31</sup> This additional weight on the landfill may cause a short-term increase in leachate migration through the seeps. On the other hand, Alternatives 5 and 6, which include seep controls, would not have this problem if the seep controls were constructed prior to importing fill for construction of the cover, because the leachate collection system would collect any additional short-term leachate.

Each of Alternatives 4c, 4d, 5, and 6 would potentially achieve the cleanup objective for eliminating the release of leachate from surface seeps. The following alternatives are predicted to "dry up" the leachate seeps and meet surface water ARARs at the sloughs within 2 years of construction completion:

- 4c Geosynthetic Cover, Passive Drainage
- 4d Composite Cover, Passive Drainage

These alternatives would cut off infiltration of rain water through the waste, thus minimizing the generation of new leachate. As the existing leachate mound within the waste dissipates, the perimeter seeps are expected to cease to flow within two years, according to the results of ground water modeling conducted by the Respondents during the RI/FS.

The following alternatives would be expected to meet the cleanup goals for leachate seeps immediately after implementation:

- 5 Geosynthetic Cover, Leachate Seep Control
- 6 Geosynthetic Cover, Seep and Zone 2 Ground Water Controls

These alternatives would intercept and collect the perimeter berm leachate, which would result in faster elimination of the seeps.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, such as the relative availability of goods and services. Also, it considers if the technology been used successfully on other similar sites.

Alternatives 4c, 4d, 5, and 6 include construction of a low-permeability landfill cover. Technically, construction of a low permeability landfill cover is a common landfill remedy that can be readily implemented at Tulalip Landfill. Generally, materials for these types of covers are available. The most significant difference in implementability regarding the Tulalip Landfill, in comparison with many other landfills, is that Tulalip landfill is

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<sup>31</sup> However, the amount of off-site fill that would need to be imported can be reduced by re-positioning existing landfill materials to achieve the necessary grades.



relatively flat, so that a mounded cover must be constructed to minimize infiltration and generation of leachate.

Another aspect of implementability is the ability to monitor the remedy's effectiveness, and the ease of maintaining the remedy. Based on EPA's experience at other CERCLA landfills across the country, geosynthetic covers have a known performance record and are relatively reliable if properly constructed. It would be relatively easy to monitor the perimeter leachate seeps to evaluate if they dry up. Water levels in piezometers located on the landfill could be monitored to evaluate whether the leachate mound within the waste is falling, which would indicate a reduction in leachate migration through the deeper Zone 2 ground water. An advantage of a landfill cover is that if an obvious problem becomes apparent, such as surface water ponding in the case of a passive drainage cover, it is relatively easy to access and make repairs because the cover is close to the surface of the landfill. All covers develop leaks, and installing a leak detection system beneath the cover is not practical. Non-essential perforations through the cover system should be minimized as they can contribute to imperfections in sealing the liner and in increased leakage.

Alternative 4c - Geosynthetic Cover with Passive Drainage, is clearly implementable at the Site. Alternative 5, Geosynthetic Cover with Seep Control, is considered somewhat less implementable because it relies on the long-term availability of capacity at a sewage treatment plant to accept and treat the collected leachate, which could be a potential administrative problem. The cost of building an on-site treatment plant would significantly increase the cost of this alternative.

Alternative 4d - Composite Cover, Passive Drainage, and Alternative 6 - Geosynthetic Cover, Seep and Zone 2 Ground Water Controls, are considered significantly less implementable. Materials to construct these alternatives are expected to be readily available. However, the Composite Cover with Passive Drainage (4d) would be technically difficult to construct because it would be time consuming and expensive to ensure that all soil material used in a soil barrier layer would meet the required standard for impermeability. An extensive construction monitoring program would be required. The technical implementability of the Cover with Seep Controls and Ground Water Controls alternative (6) is considered relatively infeasible because of the difficulty in constructing a slurry wall down into the Zone 2 aquifer. Problems such as heaving sands could make construction of such a slurry wall difficult. Also, there is no clear aquitard at depth into which a Zone 2 slurry wall could be effectively anchored. Without an aquitard to anchor the slurry wall, the ground water extraction system could potentially pull in significant volumes of "clean" water from the sloughs along



with contaminated ground water, which may greatly increase the treatment costs for this alternative.

7. Cost includes estimated capital and operation and maintenance (O&M) costs, as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollars. Cost comparison information for all of the alternatives evaluated (including those which do not meet the NCP threshold criteria) is provided in Table 9-1. The net present value of each alternative is listed in millions of dollars, calculated using a discount rate of 5% over 30 years.<sup>32</sup>

8. State acceptance: Because the Tulalip Landfill is located entirely on the Tulalip Indian Reservation, this criterion for this Site is more appropriately "Tribal Acceptance." Based on comments received from the Tulalip Tribes during the public comment period on the Proposed Plan, it is clear that the Tulalip Tribes support the selected alternative. Although State concurrence is not necessary for this Site because the landfill is located on an Indian Reservation, EPA notes that the State of Washington concurs with the selected alternative.<sup>33</sup>

9. Community acceptance considers public response to EPA's Proposed Plan during the public comment period. EPA provided an 80-day public comment period on the interim cleanup options for the Site, and held two public meetings during the comment period.<sup>34</sup> Comments were received on a wide variety of complex issues such as the remedy selection process, data collected from the Site, the Streamlined Risk Assessment, the relative cost of various remedies, concerns about fairness, and concerns about the Site's potential impact on the environment and human health. A summary of significant comments received during the public comment period, and EPA's responses to these comments, is provided in the "Responsiveness Summary" attached to this Record of Decision (ROD).

Based on EPA's evaluation of the comments received, almost all commentors expressed support or opposition to Alternative 4c, EPA's preferred alternative in the Proposed Plan. The following parties expressed general opposition to the preferred alternative:

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<sup>32</sup> EPA notes that the need for continued O&M could exceed 30 years.

<sup>33</sup> See February 22, 1996, letter from Mary E. Burg of State of Washington Department of Ecology to Chuck Clarke of EPA, in the Administrative Record for this interim remedial action.

<sup>34</sup> The NCP requires a minimum public comment period of only 30 days. EPA extended the 30-day public comment period for the Tulalip Landfill Proposed Plan to 80 days.



- Some of the Potentially Responsible Parties (PRPs), their attorneys, and consultants
- Balance Council, an organization which represents some of the PRPs

The following parties expressed general support for the preferred alternative:

- Citizens who live near the Site
- People for Puget Sound
- Audubon Society
- Tulalip Tribes of Washington, and their consultants
- Northwest Indian Fisheries Commission

The Northwest Indian Fisheries Commission expressed support for the preferred alternative but argued it didn't go far enough and more should be done. The Snohomish County Health District provided comments but did not take a clear position with regard to the preferred alternative.

Based on the comments received, EPA believes the selected remedy will be acceptable to citizens who live near the Site and who may use the areas around the Site.

Compatibility with Anticipated Future Land Use is an additional element of Community Acceptance, which, in the case of Tulalip Landfill, considers whether an alternative would be compatible with commercial, light industrial, and recreational use. Alternatives 4c, 4d, 5, and 6, which include a landfill cover, are fully compatible with these future land use objectives.

#### 10.0 THE SELECTED INTERIM REMEDY

EPA has considered, at some point in the CERCLA process, all of the alternatives that have ever been submitted to EPA by the Respondents, including Alternative 2b and 2b(ii), which were submitted after the Source Area Containment Feasibility Study was approved by EPA. After the close of the public comment period, EPA re-considered and re-evaluated all of the alternatives, including those alternatives which do not include a landfill cover. Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives using the nine NCP criteria, and public comments, EPA has determined that **Alternative 4c, Geosynthetic Cover with Passive Drainage**, is the most appropriate interim remedial action for the Tulalip Landfill Superfund Site. The Tulalip Tribes of Washington support this determination. This interim remedy would achieve substantial reduction in risk to the environment by containing the contaminants within the landfill.



EPA expects that a containment remedy that eliminates or minimizes the total contaminant loading contribution from the landfill would improve the long-term viability of the sensitive surrounding environment. Of all of the alternatives considered by EPA, a geosynthetic cover with passive drainage is the least expensive, protective containment alternative that meets all ARARs identified for this interim remedial action and that will, with a relatively high degree of certainty, effectively stem the generation and flow of contaminated leachate into the surface waters surrounding the landfill. Because this containment remedy relies on a "passive" design that does not include pumps to move surface water off of the landfill surface, the selected remedy would require less frequent monitoring to ensure that all the pumps are operational. A low permeability cover is implementable as a well known technology, and is expected to be effective in the long-term.<sup>35</sup> The selected interim remedy is a proven technology, with established means to monitor and maintain the cover. The selected interim remedy will reliably achieve the remedial action objectives of reducing risks, without the need for also establishing elaborate contingency measures to plan for the possible failure of less certain measures. This cover will also allow for future use of the Site for recreation, light industry or commercial enterprises, with certain institutional controls required to protect the integrity of the cover. Therefore, EPA believes that Alternative 4c provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

EPA expects the selected interim remedy to be effective in minimizing the migration of contaminated landfill leachate from the source area. At present, the RI/FS shows that contaminated leachate from the landfill wastes is migrating to surface water by way of leachate seeps on the surface and through deeper ground water that flows into the sloughs adjacent to the landfill. Available information suggests that leachate migration is causing contamination of soils, sediments, and fish in the off-source wetlands. In the FS, the Respondents predict that a low permeability cover will minimize the generation of additional leachate by greatly reducing the movement of contaminated ground water to surface water. This is expected to significantly reduce mass loadings of metals, organics, and bioaccumulative substances into the off-source sloughs and wetlands. By minimizing the discharge of leachate from the landfill, the selected interim remedy is also expected to minimize the discharge of resistant strains of pathogenic microbes which have been found in landfill leachate. For these reasons, the selected interim remedy in this

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<sup>35</sup> All covers develop leaks. However, leaks can be minimized through proper design, construction materials, construction quality assurance procedures, and O&M.



ROD also includes EPA's decision to take no action to remediate ground water.

#### 10.1 DESCRIPTION OF THE SELECTED REMEDY

The selected interim remedy requires installation of an engineered, low permeability cover over the source area of the landfill. The source area to be covered shall include the waste that is located within the current perimeter of the approximately 147 acre landfill, including any waste or contaminated soils in the perimeter berm, and any contaminated soils in the existing cover material. The interim remedy shall include the following:

##### 10.1.1 General Interim Remedy Requirements

The interim remedy shall be designed and constructed in accordance with the Remedial Action Objectives (RAOs) described in Section 7 of this ROD. The work will be conducted in accordance with plans approved by EPA. Guidance documents including, but not limited to, the guidance documents listed in the Appendix C of this interim ROD, shall be used to design, construct, and operate and maintain the landfill cover system. During detailed design, potential problems that may occur during implementation of the selected remedial action, such as the effect of surface water discharge on off-source wetlands, will be evaluated and addressed as appropriate. In general, all components of the interim remedy (e.g., gas collection pipes) shall be constructed beneath the surface of the cover system to facilitate future use objectives that have been identified for the Site. Non-essential perforations through the cover system shall be minimized.

This interim remedial action is expected to result in adverse impacts or loss of approximately 1.7 acres of off-source wetlands. All such losses or impacts to off-source wetlands shall be properly addressed under the substantive requirements of Section 404 of the CWA. During all phases of the interim remedial action, any adverse impacts and potential adverse impacts to the off-source area shall be avoided and minimized. Any adverse impacts shall be mitigated. As part of complying with the Stormwater Runoff and Erosion Surface RAO, surface water runoff from the cover system shall be released to the surrounding environment at a controlled rate and in a controlled manner such that damage to the surrounding environment is prevented. The interim action shall avoid and minimize adverse impact to the aesthetic value of the off-source wetlands. The interim action shall not result in erosion of off-source wetlands or destabilize wetland banks.

Mitigation or replacement for the loss of any on-source wetlands that have grown on the landfill surface since the



existing cover material was placed over the waste in 1979 will not be required under CWA Section 402.<sup>36</sup>

#### 10.1.2 Regrading

The cover system shall be designed and constructed so that the grade of the surface slopes shall be no less than two percent after allowing for predicted settlement. The final grades shall be attained through importing "clean fill" to the Site, and through excavation or regrading of waste and existing cover soil. Imported clean fill may be temporarily stockpiled on the source area prior to regrading activities, however, erosion control measures must be implemented to prevent erosion of the stockpiled fill into the surrounding wetlands.

A Regrading Erosion Control Plan shall be developed and approved by EPA prior to initiation of regrading activities. This Plan shall ensure that regrading activities do not result in erosion of on-source soil to off-source areas. The Plan shall incorporate appropriate erosion control measures which may include, but are not limited to, silt fences and sedimentation ponds.

Appropriate measures shall be implemented to ensure control of dust during regrading activities.

Appropriate measures shall be implemented to ensure that odors are minimized during regrading activities. Regrading activities shall be planned and implemented such that the amount of time that waste is exposed to air shall be minimized. Any and all exposed waste shall be thoroughly covered with at least six inches of "clean" cover soil at the end of each construction day.

#### 10.1.3 Landfill Cover System

The landfill cover system shall consist, from the lowest layer to the uppermost layer, of the following:

**Gas collection system:** A landfill gas collection system located between the waste and the cushion layer shall be designed, constructed, operated, and maintained to control combustible or toxic gas release from the landfill waste. Collection pipes shall be installed below the surface of the cover system. The gas collection system, and any associated features such as vents, shall be designed and constructed to be flush with the surface of the landfill so as not to

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<sup>36</sup> For more information, see the subheading "Operations at the Landfill after 1985" in Section 2.0 - Site History and Enforcement Actions of this interim ROD; see also interim ROD Section 11.2.3 - Action-Specific ARARs.



interfere with future land use activities on the landfill surface. The gas collection system shall be designed to be compatible with a landfill gas treatment system, which may need to be added after construction of the gas collection system is completed. The gas collection system shall be designed and constructed so that if the addition of a gas treatment system becomes necessary, the collection system can be modified to incorporate the gas treatment system without constructing additional gas collection pipes above the landfill surface.

**Cushion layer:** A cushion layer shall be placed over the landfill waste to minimize the potential of the waste damaging the low hydraulic conductivity layer. The cushion layer shall have a minimum thickness of 1 foot (12 inches), and shall be free of rock, fractured stone, debris, cobbles, rubbish and roots. In general, the cushion layer shall be designed and constructed in accordance with the following requirements:

- One hundred percent (100%) of the largest soil particles in the cushion layer shall pass the .75" sieve.
- The top 6 (six) inches of the cushion layer shall be no coarser than Unified Soil Classification System (USCS) sand (SP) with 100% of the washed, rounded sand passing the .25" sieve.
- The cushion layer shall be uniformly compacted to a minimum 90% modified proctor density (ASTM D1557) and shall be smoothed with a smooth drum or vibratory roller.
- Deformations in the cushion layer surface shall not be greater than 1 inch in depth, except if the bedding surface is frozen. If the bedding surface is frozen, then deformations shall be no greater than .5 inches in depth.

**Low hydraulic conductivity layer:** A low hydraulic conductivity layer shall consist of either of the following:

- a minimum 50 mils flexible membrane liner designed, constructed, operated and maintained to minimize infiltration of water into the landfill; or
- a geosynthetic clay liner with a maximum permeability of  $1 \times 10^{-9}$  cm/sec designed, constructed, operated and



maintained to minimize infiltration of water into the landfill.<sup>37</sup>

**Cover layer:** A cover layer shall be comprised of a minimum of 1 foot (12 inches) of soil capable of sustaining plant species that will minimize erosion and providing adequate depth and composition to minimize damage to the low hydraulic conductivity layer (i.e., loading and stresses from above, plant species roots and burrowing animal intrusion, etc.)

**Vegetation layer:** The uppermost component is vegetation designed to impede erosion while still allowing surface runoff from major storm events. Seed for the vegetation layer shall be sown as soon as practicable after placement of the cover layer to minimize erosion of the cover layer. If the vegetative layer does not "take" in all portions of the cover, these areas shall be reseeded as necessary until the vegetative layer is sufficiently established. Plant species that may invade or otherwise impair the off-source wetlands shall not be selected for the vegetation layer.

The cover system shall incorporate the construction of, at a minimum, 5 piezometers that shall be located and installed for the purpose of evaluating the height of the Zone 1 leachate mound after construction of the interim remedy.

The cover surface slopes shall not be less than two percent, after accommodating for settlement and subsidence, and the side slopes shall not be more than thirty-three percent.

The cover system shall be designed, operated, constructed and maintained to meet the following performance standards:

- (a) Prevent direct contact of people, animals, and surface water with landfill waste.
- (b) Prevent landfill waste from being wind blown.
- (c) Provide long-term minimization of migration of liquids through the landfill.
- (d) Function with minimum maintenance.
- (e) Promote drainage and minimize erosion or abrasion of the cover.

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<sup>37</sup> A geosynthetic clay liner is reasonably expected to achieve a maximum permeability of  $1 \times 10^{-9}$  cm/sec. The Respondents assumed this permeability rate in the ground water modeling they conducted for this remedial alternative during the RI.



- (f) Prevent damage to the cover from a 100-year flood event.
- (g) Accommodate settling and subsidence so that the cover's integrity is maintained.
- (h) Ensure that the perimeter berm or edge of the landfill is structurally stable.
- (i) Establish and implement a construction quality assurance (CQA) program for the cover system to ensure that the constructed cover meets or exceeds all design criteria and specifications. This shall include, but shall not be limited to, aggressive testing of field seams to ensure water tightness, and field placement oversight.

The cover system design shall include permanent access roads for operation and maintenance (O&M) activities.

#### **10.1.4 Air Controls**

If necessary to meet PSAPCA requirements, a landfill gas treatment system shall be installed. Additional study shall be conducted during remedial design to evaluate whether a landfill gas treatment system is needed. However, it is possible that sufficient information on which to base a decision on whether gas treatment is necessary may be available only after construction of the interim remedy.

#### **10.1.5 Post-Construction Care**

The integrity and effectiveness of the final cover shall be maintained, including periodic inspections and making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events. A written Operation and Maintenance (O&M) Plan shall be completed and approved by EPA. The O&M Plan shall be fully implemented at the Site in perpetuity, or until EPA determines in writing that implementation of the O&M Plan is no longer necessary at the Site.

Post-construction escape of leachate or contaminated run-off shall be controlled, minimized or eliminated, to the extent necessary, to protect human health and the environment. Run-on and run-off shall be prevented from eroding or otherwise damaging the final cover and the surrounding wetlands and tributaries including the tidal channels.



## **Post-Construction Monitoring**

A post-construction monitoring plan shall be prepared. The plan shall be approved by EPA. The monitoring plan shall be sufficient to provide for evaluation of the effectiveness of the remedy and evaluate whether the remedy remains protective of human health and the environment. Post-construction monitoring of the interim remedy shall consist of, at a minimum, the following:

- **Perimeter leachate seeps:** A minimum of 10 landfill perimeter leachate seeps shall be located and identified for sampling. On a quarterly basis, the leachate seeps shall be sampled and analyzed for chemicals that are surface water ARARs (during detailed design, EPA may select a subset of the surface water ARARs from Table 11-1 to be used for post-construction monitoring purposes). For metals, total metals analyses shall be performed for the perimeter leachate seep samples. The validated data results shall be provided to EPA, on paper in raw and summary form, and electronically (i.e., a computer file) in a format acceptable to EPA. Data validation reports for all of the samples shall be included. The flow rate from each seep shall be measured, and the daily flow rate from all ten seeps shall be estimated. All of this information described in this paragraph, including the validated sample results, shall be reported to EPA within 3 months of each sampling event as part of a "quarterly monitoring report". The "quarterly monitoring report" shall include a summary narrative that includes information relevant to the sampling event and data analyses, such as the date(s) the samples were taken, who took the samples, and any problems that were encountered. Each "quarterly monitoring report" shall provide one graph for each leachate seep which compares the flow estimate of each leachate seep from the most recent sampling round with each of the flow estimates from the seep from all previous sampling rounds.
- **Zone 1 Piezometers:** the Zone 1 leachate mound levels in the on-source piezometers shall be measured on a quarterly basis, and this information shall be submitted to EPA in the next quarterly monitoring report. Each quarterly monitoring report shall provide a graph or graphs which compares each piezometer water level reading from the most recent sampling rounds with that piezometer's water level readings from all previous sampling rounds.
- **Zone 2 ground water:** Because the selected remedy is expected to effectively contain the landfill wastes by minimizing the migration of leachate away from the landfill, and because, based on current information, EPA does not expect that additional, future actions will be necessary to



remediate Zone 2 ground water, EPA concludes that post-construction data collection from of the Zone 2 aquifer is unnecessary.

- **Landfill gas collection system:** Monitoring requirements for the landfill gas collection system shall be described in the O&M Plan. These monitoring requirements shall be sufficient to determine whether the a gas treatment system must be added to ensure compliance with PSAPCA requirements. If a landfill gas treatment system is added in the future, the O&M Plan shall be amended to include monitoring requirements for the gas treatment system.

EPA may require additional monitoring to assess or ensure the short-term and long-term effectiveness and protectiveness of the selected interim remedy. Each quarterly monitoring report shall summarize all of the monitoring data collected during the quarter, and shall provide, based on consideration of all of the collected data, an evaluation of the effectiveness and protectiveness of the interim remedy. Any changes or trends in the data from previous quarter(s) shall be noted and described. After the first two years of post-construction monitoring are complete, EPA may re-evaluate the frequency of collection of the post-monitoring data and the frequency of the quarterly monitoring reports.

The point of compliance for contaminated ground water and leachate is the location where ground water discharges to surface water. For Zone 1 ground water (i.e., the leachate seeps), the point of compliance shall be the location at which leachate exits the exterior face of the perimeter landfill berm. For Zone 2 ground water, the point of compliance shall be the location where Zone 2 ground water discharges to surface water. No mixing zone(s) shall be allowed in surface water to measure compliance with surface water ARARs. Because current information indicates that the interim remedial action, if properly constructed, will achieve the surface water ARARs where Zone 2 ground water discharges to the sloughs, additional monitoring or evaluation of the Zone 2 pathway for compliance purposes is unnecessary.

#### **10.1.6 Institutional Controls**

Institutional controls will be used to assure continued effectiveness of the interim remedial action and to prevent human exposure to contamination remaining at the Site at concentrations above health-based risk levels. Specific controls include land use restrictions to limit or prohibit activities that could interfere with performance of the selected remedy. In addition, ground water use restrictions will be implemented to prevent the use of contaminated ground water.



When design and construction of the interim remedy are complete, EPA and the Tulalip Tribes shall develop and approve a document titled "Routine Use of Tulalip ('Big Flats') Landfill," the purpose of which shall be to identify future uses of the Site that are compatible with the continued integrity of the cover system and protective of the off-source areas of the Site. This document shall delineate routine site uses that may occur on the surface of the cover and uses that shall not occur, in accordance with the land use restrictions established in this interim ROD. This document shall be implemented at the Site in perpetuity, or until EPA and the Tulalip Tribes determine in writing that implementation of the document is no longer necessary at the Site. After the document is approved by EPA and the Tulalip Tribes, the document can be modified by mutual written agreement by both EPA and the Tulalip Tribes.

The land use and ground water use restrictions will be imposed on all property that comprises the Site as covenants running with the land for the purpose of protecting human health and the environment by protecting in perpetuity the remedial actions which have been and will be taken at the Site. One or more instruments, including the "Routine Use of Tulalip ('Big Flats') Landfill" document, in a form acceptable to EPA, shall be prepared setting forth covenants, conditions and restrictions that accomplish the following objectives:

- Existing "access roadways," including the east access roadway, and the access roadways at the southeast and northwest corners of the landfill surface running from the landfill surface to the slough waterways, shall be preserved as points of access to the landfill.
- An "Environmental Buffer Zone" on the surface of the landfill cover shall be defined, established, and maintained in perpetuity. The Environmental Buffer Zone shall extend along the entire perimeter of the landfill, from the edge of the landfill cover surface (not including the relatively steep slope of the exterior face of any perimeter berm) inward toward the center of the landfill. On the north, east, and southern edges of the cover, the Environmental Buffer Zone shall be no less than 50 feet in width. On the entire western edge of the cover (i.e., the edge facing the large, approximately 170-acre wetland area to the west of the landfill), the Environmental Buffer Zone shall be no less than 250 feet in width. The Environmental Buffer Zone shall be preserved and maintained in perpetuity for passive recreation activities such as walking. The Environmental Buffer Zone shall be seeded with vegetation that is compatible with the landfill cover system and that will also provide beneficial habitat uses for wildlife. No structures, materials, or other objects shall be located, placed, stored, or constructed on the Environmental Buffer



Zone, with the following sole exception: the Environmental Buffer Zone may be crossed by necessary Site access roadways. These access roadways shall be constructed and maintained in a manner that is consistent with and does not inhibit the recreational use of the Environmental Buffer Zone.

- A clearly visible sign shall be placed and maintained in perpetuity at the landfill entrance which summarizes the activities that may occur on the landfill cover, and shall also summarize the restrictions on use, as described in the "Routine Use of Tulalip ('Big Flats') Landfill" document. The sign shall also depict a map of the Site which clearly delineates the locations and extent of the Environmental Buffer Zone, and shall clearly summarize the use restrictions for the Site, including a written description of the Environmental Buffer Zone and their purpose. The sign shall include the phone number of a Tribal officer or employee who is familiar with the requirements of the "Routine Use of Tulalip ('Big Flats') Landfill" document and is able to provide direction to potential users of the Site regarding the requirements of the document.
- Site users shall comply with the "Routine Use of Tulalip ('Big Flats') Landfill" document described above.

Any commercial or development activity on the landfill surface will require advance, written agreement between EPA and the Tribes to ensure the continued integrity of the cover system and to ensure protection of human health and the environment.

#### 10.2 INTEGRATING THE INTERIM ACTION WITH LAND USE PLANS

The selected interim remedy shall allow the on-source area of the Site to be productively used by people, with some restrictions necessary to prevent damage to the interim remedy. The selected interim remedy shall be designed and constructed to allow for the types of future use activities described in the Big Flats Land Use Program, Tulalip Landfill Remedial Investigation and Feasibility Study (July 10, 1994).

#### 10.3 PERIODIC REVIEW

Because the interim remedial action will result in hazardous substances remaining on-site above health-based levels, a review will be conducted no less often than every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. If the five-year review indicates that this interim remedial action is not providing adequate protection of human health and the environment, additional containment action for the



source area, such as implementation of a perimeter leachate collection and treatment system, may be necessary.

#### 10.4 ESTIMATED COST OF THE SELECTED INTERIM REMEDY

EPA's total cost estimate for the selected interim remedy is \$25.1 million.<sup>38</sup> This cost estimate reflects the total cost estimate provided by the Respondents in the Source Area Containment Feasibility Study (\$22.4 million), in addition to an EPA cost estimate that accounts for the possibility that a landfill gas treatment system may be necessary (\$2.7 million).

As summarized in Table 10-1, the Respondents' cost estimate for the selected interim remedy has capital costs of \$19.8 million and annual operation and maintenance costs of \$170,000 per year. The total net present value of their estimate is approximately \$22.4 million, assuming a net discount rate of 5%. Costs for this alternative are highly dependent on the assumption that the perimeter elevation of the graded surface will be 12 feet; raising or lowering this elevation could have a significant impact on the cost because it may directly affect the amount of off-site fill that would need to be brought in to achieve the 2% surface grades required by the State of Washington MFS. Table 10-1 shows that the cost estimate for "import soil" for grading purposes is \$4,000,000, out of total capital costs of \$19,841,000.

Figure 10-1 shows EPA's probable cost estimate for a contingent landfill gas treatment system, which may be necessary to comply with air pollution control requirements. The total net present value for the contingent gas system, assuming a net discount rate of 5%, is \$2.7 million. O&M costs for the gas treatment options range from \$75,000 per year for a surface collection system with an open flare, to \$131,000 per year for a vertical well system with an enclosed flare. Information supporting this probable cost estimate is provided in Figure 10-1 and Appendix B of this interim ROD.

#### 11.0 STATUTORY DETERMINATIONS

The interim remedial action selected for implementation at the Tulalip Landfill Site is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this limited-scope action, and is cost-effective. Because this action may not

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<sup>38</sup> Remedy alternative cost estimates assume Operation and Maintenance (O&M) costs over a 30-year period and a discount rate of 5%. The actual number of years that O&M may be required at the Site may be greater than 30 years. Actual Site costs are predicted to fall within a range of +50 per cent to -30 per cent for all remedy alternative cost estimates.



constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element, may be further addressed by a final response action. Given that this is an interim action ROD, review of this Site and of this interim remedy will be ongoing as EPA continues to evaluate whether additional remedies for the on-source or off-source area of the Site are necessary.

#### **11.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT**

The selected interim remedy is protective of human health and the environment. The interim remedy at this Site will permanently reduce the risks presently posed to human health and the environment by preventing contact with waste using a low permeability cover and institutional controls to restrict disturbance of the cover. The seep contact, seep migration, and groundwater migration RAOs are achieved by minimizing infiltration thereby minimizing leachate generation. As a result, the interim remedial action will be protective of human health and the environment in the long term.

The interim remedial action includes significant construction activities that could pose minor risks to workers and will result in the loss of approximately 1.7 acres of off-source wetlands. These risks and off-source wetlands loss will be mitigated as appropriate to ensure that this alternative is protective of human health and the environment.

#### **11.2 COMPLIANCE WITH ARARS**

This interim action complies with Federal and State applicable or relevant and appropriate requirements (ARARs) for this limited-scope action. As stated above, this interim action will minimize infiltration and leachate generation. Thus, seeps and ground water discharge with constituent concentrations that exceed chemical specific ARARs will be eliminated or minimized.

The Site is located on Tribal lands, and leachate from the Site is discharged to surrounding wetlands, tidal channels, and sloughs. State environmental laws and regulations affecting actions taken or occurring entirely on-Site are not legally applicable, but nevertheless may be relevant and appropriate. Under Section 300.400(g)(2) of the NCP, certain state laws and regulations may be relevant and appropriate to this interim remedial action. For example, the state laws and regulations may be relevant and appropriate if the purpose of the state law or regulation is similar to the purpose of this interim remedial action (e.g., if there is a state regulation which sets surface water quality standards for certain chemicals or substances for the purpose of protection of aquatic life and human health, then those regulations would be relevant and appropriate to this



interim action, as the purpose of this interim action is to protect aquatic life and human health from exposures to hazardous substances contained in the landfill leachate). As a general matter, permits are not required for on-site actions at NPL Sites, however, the substantive requirements of a permit that would otherwise be required must be met. The following is a discussion of the ARARs identified for this Site and for the selected interim remedial action.

#### 11.2.1 Chemical-Specific ARARs

Chemical-specific requirements are usually health- or risk-based numerical values or methodologies that establish the acceptable amount or concentration of a chemical in the ambient environment. Following are the chemical-specific requirements for the Tulalip Landfill:

State of Washington Water Pollution Control Act/Water Resources Act -- Chapters 90.48 and 90.54 of the Revised Code of Washington ("RCW"); and the State of Washington Water Quality Standards for Surface Waters - Chapter 173-201A WAC

These statutes, through their implementing regulations including, but not limited to, those requirements codified at Chapter 173-201A of the Washington Administrative Code ("WAC"), require the use of all known available and reasonable technologies in the treatment of wastewater prior to a release or discharge of such wastewater into waters of the State. The statutes themselves do not contain any numerical criteria or standards. However, Chapter 173-201A of the WAC contains both narrative and quantitative limitations for protection of surface waters by regulating discharges to sewers and surface waters, and establish discharge limits for water quality parameters and toxic substances.

Because the leachate seeps and Zone 2 groundwater at the Site discharge into waters of the State, and since the WAC Chapter 173-201A requirements set the water quality standards for surface water, the WAC 173-201A regulations are relevant and appropriate for this interim remedial action. Specifically, for this interim remedial action, the surface water limitations are described in Table 11-1. For monitoring purposes, EPA may select a subset of the surface water ARARs listed in Table 11-1 during detailed design. The surface water ARARs listed in Table 11-1 do not account for practical quantitation limits (PQLs), or surface water background. To account for PQLs and background, EPA plans to adjust compliance levels for the Table 11-1 ARARs as appropriate.

Given the presence of marine and estuarine aquatic organisms in the waters surrounding the Landfill, the marine criteria



listed in WAC 173-201A-040 are considered to be the relevant and appropriate standards which are to be complied with for discharges to surface waters associated with this interim action.

This interim action will attain the WAC 173-201A ARARs by stemming the flow of contaminated ground from the source area. Specifically, the selected interim remedy is expected to minimize the discharge of leachate to Zone 2, and eliminate the perimeter berm leachate seep discharges through the perimeter berm. EPA notes that the selected interim remedy is not expected to achieve surface water ARARs immediately after construction. It may take a few years (ground water modeling conducted by the Respondents estimated 2 years) for the selected interim remedy to eliminate the perimeter berm seeps, however, EPA expects that all surface water ARARs will be met by the conclusion of remedial action at the Site as required by CERCLA as amended by SARA. Over the long term, Alternative 4c allows significantly less loading of contaminants to the surrounding environment, and significantly less leachate to discharge from the landfill than other, less expensive alternatives, notably Alternatives 2b and 2b(ii).

Federal Water Pollution Control Act ("FWPCA")/Clean Water Act ("CWA") -- 33 U.S.C. §§ 1251-1376; 40 C.F.R. Parts 100-149

These statutes and their implementing regulations govern discharges of water and wastewater to sewers, surface water, and site runoff that is directed to a water body subject to the Acts. They establish point source standards for discharges into surface water bodies under the National Pollutant Discharge Elimination System ("NPDES"). They also establish ambient water quality criteria ("AWQC") for the protection of aquatic organisms and human health.

Federal AWQC, promulgated at 40 C.F.R. Part 131, are guidelines set for various contaminants in surface water bodies. These guidelines are expected to be protective of most aquatic life against acute or chronic toxicity, or protective of human health with respect to fish consumption and water ingestion. CERCLA Section 121(d)(2)(B)(i) specifically states that water quality criteria are to be attained "where relevant and appropriate" at CERCLA sites.

The federal AWQC are used by the States to set water quality standards for surface water. See Chapter 173-201A WAC. In general, the state water quality standards for surface water adopt the federal AWQC, and in some cases are more stringent. In those cases in which the state standards are more stringent than the federal standards, the state standards are more relevant and appropriate than the federal standards.



The federal AWQC are relevant and appropriate to this interim action because the purpose of the federal AWQC, among other things, is to protect aquatic organisms and human health from high levels of toxic pollutants, and the purpose of this interim action is to minimize the release of leachate containing toxic pollutants from the landfill to the adjacent wetlands and sloughs which would harm human health and aquatic organisms. Thus, EPA believes that the use of federal AWQC are well suited to the Tulalip Landfill. Federal AWQC that are relevant and appropriate requirements for this interim response are provided in Table 11-1.

The wetlands and tidal channels surrounding the Site are included in the CWA definition of "surface water," and the use of AWQC to evaluate leachate seeps discharging directly into the wetlands and tidal channels is therefore relevant and appropriate.

This interim action is expected to attain surface water ARARs, including the federal AWQC, by stemming the flow of contaminants from the landfill (see the last paragraph of the section above regarding "State of Washington Water Pollution Control Act/Water Resources Act").

Certain arguments were raised by the Respondents regarding the federal AWQC and the state water quality standards during the preparation of the Feasibility Study by the Respondents under the AOC. The Respondents initiated the formal Dispute Resolution process under the AOC to resolve these arguments. Since these issues affected EPA's decision-making process at this Site, a discussion of these disputed issues and the outcomes is given below.

**Use of Mixing Zones.** EPA's final determination in the Dispute Resolution process stated that mixing zones are not appropriate for evaluating compliance with state water quality standards at the Tulalip Landfill. EPA's position is consistent with WAC Chapter 173-201A, which is identified as an ARAR in this interim ROD for the Site. Under the CWA and WAC 173-201A-100, the term "surface waters" includes wetlands, tidal channels, and mudflats, which are precisely the kind of landforms found around the perimeter of the landfill. Results of the RI indicate that the landfill leachate contains hazardous substances in concentrations exceeding the WAC 173-201A standards. This leachate is regularly discharging directly to the wetlands and mudflats that surround the landfill. Therefore, the leachate discharges must attain the WAC 173-201A standards at the point where leachate discharges into surface waters around the landfill.

Respondents failed to justify the use of a mixing zone for evaluating compliance with AWQCs because they did not provide to



EPA in the RI/FS any information which shows that the Tulalip Landfill leachate meets any of the conditions set forth in WAC 173-201A-100, which must be met in order for a mixing zone to be granted. Some of these conditions include, but are not limited to, information which clearly indicates the mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health. See WAC 173-201A-100(4). Information collected by the Respondents' contractors shows numerous measured exceedances of AWQC in landfill leachate. These exceedances indicate that the landfill leachate has a reasonable potential to present an imminent and substantial endangerment to public health, welfare, or the environment.

Additionally, EPA believes that use of a mixing zone is inappropriate at the Tulalip Landfill because a mixing zone would not be protective of organisms that live in the sediments surrounding the landfill. These species are likely to be directly exposed to concentrated levels of chemicals from the leachate seeps when there is no "clean" water available for mixing when there is a low tide, and at locations where Zone 2 ground water discharges to surface waters.

Explanation of how the State of Washington regards the use of mixing zones or "dilution zones" at hazardous substance sites can be found in the MTCA groundwater protection standards codified at WAC 173-340-720(6)(d)(i), which states as follows:

"(d) At sites where the affected ground water flows into nearby surface water, the cleanup level may be based on protection of the surface water. At these sites, the department may approve a conditional point of compliance that is located within the surface water as close as technically possible to the point or points where ground water flows into the surface water. Conditional points of compliance may be approved only if the following requirements are met:

(i) Use of a dilution zone under WAC 173-201-035 [now WAC 173-201A-100] to demonstrate compliance with surface water cleanup levels shall not be allowed."

This is relevant and appropriate for both the leachate that discharges through the landfill berm directly into surface waters of the state (i.e., the surrounding wetlands), and the leachate that migrates through the deeper ground water and directly enters the sloughs (also surface waters). Both of these discharges are ground water discharges to surface water, and as such the MTCA regulations would not allow the use of a dilution zone to demonstrate compliance with the surface water cleanup levels.



**Use of "brackish" water AWQCs.** The Respondents also raised in Dispute Resolution the issue of interpolation of AWQCs for "brackish" waters, as permitted under WAC 173-201A-060(2). EPA's final determination in the Dispute Resolution was that the most appropriate ARARs analysis consistent with CERCLA and the NCP uses the most stringent of the freshwater or marine criteria to determine compliance with ARARs in an environment where both freshwater and marine biota may be present.

Review of the available biological survey data indicates that primarily marine organisms inhabit the waters surrounding the Tulalip Landfill. The presence of marine aquatic receptors in the vicinity of the Landfill is of primary importance in the selection of relevant and appropriate water quality criteria. The marine organisms observed near the Site are likely the primary receptors for off-site contaminant migration. As such, use of marine criteria for evaluating potential toxicity to these organisms is the most appropriate and protective approach. Therefore, EPA determined that interpolating brackish water quality criteria for this Site is not appropriate.

**Use of dissolved metals data for calculating AWQC under State law.** A third issue raised by the Respondents in Dispute Resolution relates to the use of dissolved metals data, as well as total metals, in calculating Marine Chronic Criteria (MCC) AWQC under WAC 173-201A-040, footnote dd. This issue involves several ARARs: Federal Water Quality Criteria (FWQC), state ambient water quality standards, and state cleanup requirements promulgated under MTCA. EPA agrees with the Respondents that the AWQC promulgated by the State, and most recently FWQC, measure at least some of the water quality criteria using dissolved metals data. However, WAC 173-340-730(7)(c) states that "[c]ompliance with surface water cleanup standards shall be determined by analyses of unfiltered surface water samples, unless it can be demonstrated that a filtered sample provides a more representative measure of surface water quality." The Respondents did not demonstrate that the filtered samples would provide a more representative measure of surface water quality. As such, and based on available information, unfiltered samples provide a more representative measure of surface water quality at this Site.

This approach is consistent with EPA's May 4, 1995, Administrative Stay of specific metals criteria contained in the National Toxics Rule ("NTR") 60 Fed. Reg. 22228 (May 4, 1995). The NTR contains numeric water quality criteria for toxic pollutants and was promulgated by EPA on December 22, 1992, for the fourteen states that had not adopted sufficient water quality criteria (of which the State of Washington was one). The NTR brought those states into compliance with Section 303(c)(2)(B) of the Clean Water Act, which required all states to adopt criteria



for all toxic pollutants. Among the criteria in the NTR were aquatic life water quality criteria for metals.

At the time the NTR was promulgated, it was EPA's policy to express metals criteria using total recoverable metal concentrations. While metals criteria could be implemented by measuring either total recoverable metal or dissolved metal, total recoverable metal measurement, being more conservative, provided a greater level of protection than dissolved metal measurement. See 60 Fed. Reg. at 22228.

After promulgation of the NTR, EPA continued to address the issue of how to best express metals criteria. EPA held a meeting with invited experts in January 1993 to further elicit comment on the use of total recoverable versus dissolved metal criteria. On October 1, 1993, the EPA Office of Water issued guidance (the "Metals Policy") on the interpretation and implementation of metals criteria providing that "[i]t is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal." (Underlining added). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria."

A number of plaintiffs brought lawsuits in 1993 challenging the NTR metals criteria. In settlement of that litigation, EPA agreed to issue the May 4, 1995, administrative stay of the numeric aquatic life water quality criteria (expressed as total recoverable metal). This stay will remain in effect until EPA promulgates new metals criteria based upon dissolved metal.

However, on page 22230 of the May 4, 1995, administrative stay, EPA stated the following concerning the Office of Water's October 1, 1993, "Metals Policy":

"The adoption of the Metals Policy did not change the Agency's position that the existing total recoverable criteria published under Section 304(a) of the Clean Water Act continue to be scientifically defensible. EPA developed the total recoverable criteria using high-quality analytical data and are still scientifically defensible criteria. When developing and adopting its own standards, a State, in making its risk management decision, may wish to consider sediment, food chain effects and other fate-related issues and decide to adopt total recoverable or dissolved metals criteria." (Emphasis added).



Thus, EPA recognizes that using total metals criteria may in some cases be the best way to quantify the risk posed by exposure to metals to aquatic life and human health. In this case, EPA has decided that quantifying total, rather than dissolved, metals concentrations in leachate seeps is the most appropriate approach for assessing overall exposure (via all exposure routes including ingestion and dermal contact) and potential ecological risks to fish and invertebrates residing in the vicinity of the Tulalip Landfill. EPA does not consider the filtered leachate data to adequately represent the potential risks to these receptors at this Site, and thus requires that total metals must be used for assessing such risks and for showing compliance with the ARARs.

Washington State Model Toxics Control Act ("MTCA") --  
RCW Chapter 70.105D; WAC Chapter 173-340

MTCA contains numerical cleanup standards for groundwater, surface water, soils, air, and sediments. The MTCA regulations that pertain to the Tulalip Landfill are the groundwater and surface water cleanup standards contained in WAC 173-340-720 and -730. These regulations address groundwaters and "surface waters of the state" that are affected or potentially affected by a release of a hazardous substance to those waters.

WAC 173-340-720 regulations are relevant and appropriate to this interim remedial action because the purpose of these regulations is to protect human health and the environment through the establishment of numeric cleanup standards for hazardous substances in groundwater and contain prerequisites for the use of "mixing zones" to determine compliance with these standards when groundwater discharges to surface waters. Likewise, the purpose of this interim action is to protect human health and the environment by minimizing leachate discharges from the Tulalip Landfill which contain hazardous substances above the numeric standards in the regulations.

In addition, WAC 173-340-730 regulations are relevant and appropriate to this interim remedial action because the purpose of these regulations is to protect human health and the environment through the establishment of numeric cleanup standards for surface water. Likewise, the purpose of this interim action is to protect human health and the environment and surface water by minimizing leachate discharges from the Tulalip Landfill which contain hazardous substances above the numeric standards in the regulations. Thus, EPA believes that the use of WAC 173-340-720 and -730 are well-suited to the Tulalip Landfill.

This interim action will attain the MTCA ARARs identified above by effectively stemming the flow of leachate from the landfill (see the last paragraph of the section above regarding "State of Washington Water Pollution Control Act/Water Resources Act").



### 11.2.2 Location-Specific ARARs

Location-specific ARARs are restrictions placed on either the concentration of hazardous substances or the conduct of activities performed in certain locations. They may restrict or preclude certain remedial actions or may apply only to certain portions of the area of contamination.

#### U.S. Fish & Wildlife Coordination Act, 16 U.S.C. §§ 661 et seq.

The Fish and Wildlife Coordination Act prohibits water pollution with any substance which is deleterious to fish, plant life, or bird life. Contaminated leachate from the Tulalip Landfill discharges into the surface water surrounding the landfill, causing potential harm to fish, plant life, and bird life; therefore, this Act is relevant and appropriate to the implementation of the selected interim remedial action.

This interim action will attain the requirements of this Act as the cap will minimize the continued production of leachate from the Tulalip Landfill and thereby minimize pollution from the Landfill which may be deleterious to wildlife.

### 11.2.3 Action-Specific ARARs

Action-specific ARARs are typically technology- or activity-based requirements or limitations on actions. These requirements are not triggered by the specific contaminants identified at a site, but by activities related to the management of these contaminants.

#### **Landfill Regrading and Capping**

#### Federal Standards for Municipal Solid Waste Landfills, 40 C.F.R. Part 258

#### Minimal Functional Standards ("MFS") for Solid Waste Handling, WAC Chapter 173-304

The federal regulations governing landfill closure are codified at 40 C.F.R. Section 258.60. These regulations require installation of a final cover system that is designed to minimize infiltration and erosion. This final cover system must be comprised of an erosion layer underlain by an infiltration layer as follows:

- 1) "The infiltration layer must be comprised of a minimum of 18 inches of earthen material that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or



a permeability no greater than  $1 \times 10^{-5}$  cm/sec, whichever is less, and" (40 C.F.R. Section 258.60(a)(1)).

- 2) "The erosion layer must consist of a minimum of 6 inches of earthen material that is capable of sustaining native plant growth." (40 C.F.R. Section 258.60(a)(2)).

These federal regulations are relevant and appropriate for the Tulalip Landfill because the regulations address closure of solid waste landfills and EPA believes their use at the Tulalip Landfill is well suited.

To the extent that the Washington State MFS are more stringent than the federal requirements, the MFS will be the ARAR which must be met at the Site. The Washington State MFS regulations for solid waste are provided in WAC 173-304. These regulations require that landfills will be closed to meet the following criteria at closure:

- 1) "At least two feet of  $1 \times 10^{-6}$  cm/sec or lower permeability soil or equivalent shall be placed upon the final lifts" and that "Artificial liners may replace soil covers provided that a minimum of fifty mils thickness is used" (WAC 173-304-460(3)(e)(i)).
- 2) "The grade of the surface slopes shall be no less than two percent" (WAC 173-304-460(3)(e)(ii)).
- 3) "Final cover of at least six inches of topsoil be placed over the soil cover and seeded with grass, other shallow rooted vegetation or other native vegetation" (WAC 173-304-460(3)(e)(iii)).

The current State of Washington MFS for landfill closure under WAC 173-304 are not legally applicable because the Site is located on Tribal lands where State requirements are not enforceable. However, the current MFS standards are relevant and appropriate because the Tulalip Landfill was a disposal site for solid wastes, and the purpose of WAC 173-304 was to specify requirements which are suited for use in specifying how landfills should be closed. The stated purpose of these regulations is "establishing these standards as minimum standards for solid waste handling to provide a state-wide consistency and expectation as to the level at which solid waste is managed throughout the state." WAC 173-304-010(6). The specific requirements stated above are well suited to the interim remedial action to be performed at this Site, and are therefore, relevant and appropriate requirements.



This interim action will attain the 40 CFR Part 257 requirements, and the WAC 173-304 requirements through the installation of a cap which meets or exceeds the specific technical requirements listed above. The cap will meet or exceed the Federal closure requirements and the State MFS requirements, including the requirements for final slopes, cover components, and construction measures.

WAC Chapter 173-301 was the State of Washington's old MFS for solid waste that was effective from 1972 to 1985 and was in place in 1979. These regulations required that sanitary landfill surface areas be closed by covering with an equivalent of two feet of compacted soil that is sloped to allow for surface water runoff (WAC 173-301-305). The old MFS regulations also required that the finished surface of the filled area be covered with adequate tillable soil and seeded with native grasses or other suitable vegetation (WAC 173-301-306). The WAC 173-301 MFS regulations are not ARARs for this interim action, as they do not meet the requirement of being legally in effect at this time (they are no longer promulgated, instead they have been superseded by Chapter 173-304 WAC).

#### **Excavation and Filling**

##### Section 402 of the Clean Water Act ("CWA") -- 33 U.S.C. § 1342

Normally, any sort of action to dredge or fill wetlands is governed by Section 404, not 402, of the CWA. However, in November 1984, the U.S. Army Corps of Engineers informed the Tulalip Tribes of the Corps' decision that the landfill capping activities that the Tribes were undertaking in the 1980's would fall under the authority of Section 402 of the CWA, not Section 404. The Corps based its reasoning on the fact that the Corps characterized the Tribes' efforts to install a more effective cover over the Tulalip Landfill wastes as "an essential feature of the landfill/wasting operation" at the Site which the Corps believed was subject to Section 402 of the CWA. Thus, for the purposes of this interim action, Section 402 of the CWA is the applicable requirement governing capping activities occurring on the on-source area of the landfill, not Section 404.

Section 402 of the CWA established the NPDES permit program, which governs direct discharges from point sources. The NPDES permit regulations contain provisions for discharge limitations, monitoring requirements, and best management practices. Because this interim action is being conducted entirely on-site, Section 121(e) of CERCLA does not require that a NPDES permit be issued to cover these on-site discharges. However, this interim action will meet all substantive requirements of a NPDES permit for any on-site discharges. Consistent with the requirements of CWA Section 402, mitigation for the loss of any on-source wetlands



that may exist on the landfill surface will not be required under this ARAR.

This interim action will attain the substantive requirements of Section 402, including NPDES, for the placement of fill on the on-source area of the landfill during detailed design and remedial action by minimizing the generation and discharge of leachate from the landfill source area into surface waters. Discharges to the off-source area of the Site are not covered under CWA Section 402 (see the discussion below regarding CWA Section 404).

Section 404 of the Clean Water Act -- 33 C.F.R. Parts 320 through 330 and 40 C.F.R. Part 230

Section 404 of the CWA regulates the discharge of fill material into the waters of the U.S., including wetlands. The guidelines for this program are set forth in 33 C.F.R. Parts 320 through 330 and 40 C.F.R. Part 230, and are established to ensure that proposed discharges are evaluated with respect to impacts on aquatic ecosystems. Thus, Section 404 and its implementing regulations are applicable to any dredge and fill actions occurring off-source as part of this interim action.

The regulations set up two separate forms of authorization for the discharge of dredged or fill material into wetlands. The first are nationwide permits which authorize certain activities in wetlands if that activity and the permittee satisfy all of the nationwide permit terms and conditions. Nationwide Permit Number 38 authorizes specific work needed to contain, stabilize, or remove hazardous and toxic wastes, provided such work is done, ordered, or sponsored by a government agency with appropriate authority. The second form of authorization, an individual permit, is required for off-source dredge and fill actions if the Corps of Engineers determines that the activities will result in more than minimal impacts to the wetlands. Any discharge or fill material into the wetlands surrounding the Site which are not authorized in a nationwide permit will require an evaluation in accordance with Section 404(b)(1) of the CWA and a determination by EPA regarding compliance with the substantive requirements of CWA 404 guidelines and the type and level of mitigation appropriate for the project.

This interim action will attain the substantive requirements of Section 404(b) for the of the CWA for the off-source areas during detailed design and remedial action. Discharges to the landfill surface are not covered under CWA 404 (see the section above regarding CWA 402).



## **Air Emissions**

Clean Air Act (42 U.S.C. §§ 7401 et seq.) -- National Primary and Secondary Ambient Air Quality Standards, 40 C.F.R. Part 50; Washington State Clean Air Act (R.C.W. 70.94); Puget Sound Air Pollution Control Authority ("PSAPCA") Regulations I and III.

These regulations govern emissions of particulates and certain priority pollutants to the air from on-site sources. Federal Clean Air Act regulations are applicable for on-site air emissions for control of dust particles emitted to the air during remedial activities. Remedial actions that would result in air emissions will be designed to meet federal air quality standards. The state Clean Air Act and PSAPCA regulations are relevant and appropriate requirements. Remedial actions that could involve releases of contaminants to the air will be performed in compliance with the substantive requirements of a PSAPCA permit; however, on-Site actions will not require a PSAPCA permit.

These air emissions requirements will be attained during and after construction of the interim remedial action. An evaluation will be conducted to ensure that landfill gas emissions comply with these requirements.

### **11.2.4 To Be Considered**

The following are not ARARs, but instead are "to be considered" ("TBC") when implementing the selected remedy. Detailed design and construction of the interim remedy shall be consistent with the TBCs as appropriate.

Coastal Zone Management Act ("CZMA"), 6 U.S.C. §§ 1451-1464; State of Washington Shoreline Management Act ("SMA"), Chapter 90.58 RCW

These statutes impose certain requirements for construction and development of shorelines. The prerequisite of these statutes, the presence of shorelines of statewide significance, including marine waters and wetlands, is met at this Site given that the Snohomish River Delta has been identified as a shoreline of state significance.

These statutes are TBC during detailed design and remedial action.

### **40 C.F.R. Part 6, Appendix A**

40 C.F.R. Part 6, Appendix A implements two Executive Orders, Executive Order 11988 - "Protection of Floodplains" and Executive Order 11990 - "Protection of Wetlands"). Normally, this Appendix would be considered for both the on-source and off-



source areas of the Site, but because the on-source area is to be addressed under the requirements of CWA 402, this Appendix is to be considered for only the off-source areas of the Site. The two Executive Orders are also TBCs, and are described directly below.

This Appendix is TBC for the off-source areas during detailed design and remedial action.

Executive Order 11988 - "Protection of Floodplains" and  
Executive Order 11990 - "Protection of Wetlands"

These two Executive Orders are implemented by 40 C.F.R. Part 6, Appendix A, which is described directly above. The Executive Orders direct that actions occurring within floodplains must be performed so as to avoid adverse impact to the floodplain, and to minimize potential harm and to restore and preserve the natural and beneficial values of the floodplain, and that actions occurring within a wetland must be performed so as to minimize the destruction, loss, or degradation of wetlands. The prerequisite for the floodplain Executive Order to apply is that actions will occur in a floodplain, i.e., lowlands, and relatively flat areas adjoining inland and coastal waters and other flood-prone areas. Although the landfill surface is above the 100 year floodplain, the surrounding wetlands are below the flood level.

Within and adjacent to wetlands, Executive Order 11990 and EPA's Wetlands Action Plan direct actions to be performed so as to minimize the destruction, loss, or degradation of wetlands. The off-source areas of the Site are ecologically very productive wetlands that have been classified as wetlands by the Army Corps of Engineers, therefore, both the wetlands Executive Order and the Wetlands Action Plan are to be considered in the off-source area of the Site when implementing the remedy.

These Executive Orders are TBC for the off-source areas during detailed design and remedial action.

State of Washington Shoreline Management Act ("SMA") --  
Chapter 90.58 RCW, WAC Chapter 173-16

WAC 173-16-060(14) directs landfilling in shoreline areas to be designed such that significant damage to existing ecological values or natural resources does not occur. In addition, fill materials should be of such quality that they will not cause water quality problems and perimeters of fills should be vegetated or otherwise protected from erosion.

Guidelines for shoreline protection measures (such as riprapping and other bank stabilization measures) are provided in WAC 173-16-060(17). Shoreline protection measures should be located, designed, and constructed to avoid the need for



channelization and to protect the natural character of the streamway.

These regulations are TBC for the off-source areas for this interim action because the actions to be taken as part of the interim action, excavation and filling, are the same actions regulated by the SMA and WAC 173-16. In addition, the locations where the interim action is taking place (e.g., filling of off-source wetlands for placement of the cap, bank stabilization measures, and stormwater controls constructed in the off-source wetlands) are the same locations regulated by the Act and WAC 173-16. Thus, the SMA and WAC 173-16 are TBC.

The SMA and WAC 173-16 are TBCs for the off-source wetlands during detailed design and remedial action. The interim remedy shall include shoreline protection measure(s) as appropriate, during and after construction, to avoid channelization in the off-source area and to protect the natural character of the off-source area.

#### PSAPCA Guidelines For Acceptable Ambient Levels ("AALs")

These guidelines are not ARARs because they are non-promulgated guidance, but instead are guidelines to be considered when implementing the selected remedy. This TBC shall be considered when remedial actions produce air emissions. The AAL guidelines specify that actions producing air emissions must meet the guidelines. They are used to help implement PSAPCA Regulation III (see the discussion under "Air Emissions" in Section 11.2.3 - Action-Specific ARARs), which governs releases of toxic air pollutants.

These guidelines shall be considered in decision-making regarding air emissions and the potential need for landfill gas treatment.

### **11.3 COST-EFFECTIVENESS**

Cost savings are built into the presumptive remedy approach. The EPA guidance document "Presumptive Remedies: Policy and Procedures, EPA 540-F-93-047 (September, 1993) states on page 2:

#### **"Why Should Presumptive Remedies Be Used?"**

Presumptive remedies are expected to have several benefits. Limiting the number of technologies considered should promote focused data collection, resulting in streamlined site assessments and accelerated remedy selection decisions which achieve time and cost savings. Additional time savings could be realized during the remedial design since early knowledge of the remedy may allow technology-specific data to be collected upfront during the remedial



investigation (RI). Presumptive remedies will also produce the added benefit of promoting consistency in remedy selection, and improving the predictability of the remedy selection process for communities and potentially responsible parties (PRPs)." (underlining added).

In the case of Tulalip Landfill, EPA and the PRPs were able to achieve cost and time savings by structuring the RI/FS to follow the presumptive remedy approach. Money and time were saved because EPA and the PRPs agreed in the RI/FS AOC to focus the data collection and streamline site assessments. This early/interim ROD represents accelerated remedy selection, which translates into time and cost savings.

The cost of the selected interim remedy is proportional to its overall effectiveness and it represents a reasonable value for the money to be spent. The selected interim remedy is the least expensive alternative that meets both of the NCP threshold remedy evaluation criteria: overall protection of human health and the environment, and compliance with applicable or relevant and appropriate requirements.

EPA's total cost estimate for the selected interim alternative is \$25.1 million. This cost estimate reflects the total cost estimate provided by the Respondents in the Source Area Containment Feasibility Study (\$22.4 million), in addition to an EPA cost estimate that accounts for the possibility that a landfill gas treatment system may be necessary (\$2.7 million) to meet emissions requirements of the Puget Sound Air Pollution Control Authority (PSAPCA).

EPA believes that there is significantly more certainty associated with the cost estimate for the selected interim remedy than for some of the other alternatives that did not meet the NCP threshold criteria, especially Alternatives 2b and 2b(ii), which the Respondents assert are viable containment alternatives. The selected interim remedy includes a low permeability landfill cover system, which is a proven technology for containing landfill wastes. Materials for landfill covers are, in general, readily available, and their costs are relatively certain. Low permeability covers have been installed on hundreds of landfill sites across the country. Based on EPA's experience with landfill covers, EPA believes that a properly constructed landfill cover is likely to effectively contain the waste at the Tulalip Landfill over the long term with relatively low operation and maintenance (O&M) costs. Landfill covers have a proven track record as an effective, relatively low cost remedy for landfill sites. Following implementation of the landfill cover, there is relatively little likelihood that the cover would fail to contain the landfill contaminants, and thus costly contingent actions will be avoided. Because of the knowledge base that has been developed regarding landfill covers and their performance, EPA



believes that the cost estimate for the selected interim remedy is relatively accurate. EPA notes that a significant factor affecting the cost of the selected interim remedy is the cost of importing fill to attain the minimum surface slopes required by the MFS. If the amount or cost of imported fill can be minimized during detailed design, the actual cost of the selected interim remedy may be less than the \$25.1 million estimate. In addition, if treatment of landfill gas turns out to be unnecessary, the total cost estimate for the selected interim remedy falls to \$22.4 million, an estimated savings of \$2.7 million.

EPA believes that the cost estimates for Alternatives 2b and 2b(ii), on the other hand, are considerably less certain. Because the implementability and effectiveness of these alternatives at a Site like Tulalip Landfill are unknown,<sup>39</sup> the actual cost of implementing either of these alternatives could turn out to be much higher than the current cost estimates that have been developed by EPA and the Respondents. In EPA's view, the significant differences between the Respondents' cost estimates for Alternatives 2b and 2b(ii) [\$13.3 million and \$11.8 million, respectively), and EPA's cost estimates for the same alternatives (\$21.3 million and 20.8 million, respectively), reflect the uncertainty of the cost estimates for these alternatives, as compared to the relative certainty of the cost estimate for the selected interim remedy.

EPA's cost estimates for Alternatives 2b and 2b(ii) are significantly higher than the Respondents' estimates in part because EPA has attempted to fashion more realistic cost estimates that take into account some of the uncertainty that is inherent in these alternatives.<sup>40</sup> When EPA's cost estimates for Alternatives 2b and 2b(ii) are used, it is clear that the costs for these alternatives are relatively comparable to the cost of the selected interim remedy. However, even EPA's more realistic cost estimates could seriously underestimate the actual costs of implementing 2b and 2b(ii) if unforeseen problems develop which would require expensive contingent actions to mitigate the problems. EPA has serious concerns with regard to the potential implementability and effectiveness of Alternatives 2b and 2b(ii).<sup>41</sup> For example, EPA believes that the collection system proposed for these alternatives could develop serious problems, such as clogging or plugging of the drainage media in the

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<sup>39</sup> The Respondents have been unable to identify any other similar landfill Site where a similar system has been successfully implemented.

<sup>40</sup> See interim ROD Appendix A for more information on how and why the Respondents' and EPA's cost estimates for Alternatives 2b and 2b (ii) differ).

<sup>41</sup> See interim ROD Appendix A.



collection trenches.<sup>42</sup> In the event that the collection system turns out to be ineffective at containing landfill wastes, or prohibitively expensive to operate and maintain, it may eventually be necessary to implement the Alternative 4c cover as a contingent action, which would significantly raise the total source area response costs. EPA also has significant concerns with regard to the long term effectiveness of the Alternative 2b treatment berms as they have been proposed for use at this Site.<sup>43</sup>

As discussed in the Proposed Plan at page 18, the \$170,000 per acre estimate for the selected interim remedy is significantly less than the average cost per acre found in a study conducted by the U.S. Department of Defense of a number of landfills (see the document "Comparison of DOD and EPA/Private Sector Waste Site Cleanup Efforts" in the administrative record for this interim ROD). The Department of Defense study concluded that the actual average cost per acre to remediate the landfills they studied was \$208,000 for landfill remedies implemented by the Department of Defense, and \$294,000 per acre for landfill remedies implemented by EPA or private parties.

Available information also indicates that the cost per acre for implementing the selected interim remedy is comparable (actually somewhat lower) than the average cost per acre for implementing landfill covers at landfills of similar size. In comparing the cost per acre of the selected interim remedy with landfills of similar size where a landfill cover was selected, the average cost per acre for other landfills exceeds \$173,000,<sup>44</sup> versus \$170,000 per acre for the selected interim remedy (see Appendix E of this interim ROD for more information). Although no two landfills are exactly the same in terms of acreage and details of the remedy, in general, available information suggests that the cost per acre predicted for the selected interim remedy is comparable to or less than the per acre costs for other landfills.

Because the selected interim remedy is a "passive" system that does not require any pumps or other active systems, the

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<sup>42</sup> See interim ROD Appendix D for EPA's specific comments on the Respondents' proposal for Alternative 2b(ii).

<sup>43</sup> See EPA's August 3, 1995 comment letter on Alternative 2b (Eric Winiecki, EPA, to Anthony Burgess, Golder), in the administrative record for this interim ROD.

<sup>44</sup> This estimate is derived from cost estimates for relevant landfills from the 30 CERCLA landfill FS Reports that EPA used as the basis for developing the *Feasibility Study for CERCLA Municipal Landfills*, September, 1993.



operation and maintenance (O&M) costs for this alternative are low relative to those predicted for Alternatives 2b and 2b(ii), which rely on active pumping systems. Lower O&M costs make the selected interim remedy a more effective remedy for the long term.

In summary, EPA believes that the selected interim remedy 4c is the most cost effective alternative because it is the lowest cost alternative that meets the two NCP threshold criteria. Given the proven track record of low permeability covers as implementable and effective containment remedies at landfill sites like the Tulalip Landfill, EPA believes that the selected interim remedy is the least expensive remedy that is most likely to provide an adequate level of protection at a reasonable cost, with relatively low risk that the cost estimate for 4c would be significantly exceeded.

EPA concludes that, relative to Alternatives 2b and 2b(ii), the selected interim remedy is cost effective because when EPA's more realistic cost estimates are used, the relative costs of 2b, 2b(ii), and 4c are comparable. In addition:

- EPA believes there is a relatively low level of certainty with regard to the available cost estimates for Alternatives 2b and 2b(ii);
- EPA has sufficient reason to expect that the actual costs of these Alternatives 2b and 2b(ii) could turn out to be significantly higher than the EPA cost estimates for these alternatives because they employ unproven technologies and could require expensive contingencies, possibly including implementation of a low-permeability cover, to effectively contain the landfill wastes.
- EPA does not consider Alternatives 2b and 2b(ii) to be protective of human health and the environment, nor do these alternatives meet ARARs.<sup>45</sup>

Given these considerations, EPA concludes that the selected interim remedy is more cost effective than Alternatives 2b and 2b(ii). In considering the NCP evaluation criteria, the selected remedy represents the best balance of costs, protectiveness, permanence, and long-term effectiveness.

#### 11.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

The principal element of the selected remedial action is containment which will be achieved by installing a low

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<sup>45</sup> See Section 9.0 - Summary of Comparative Analysis of Alternatives.



permeability cap over the landfill. Containment addresses the primary threat at the Site of infiltration and leachate generation by minimizing groundwater and seep leachate migration and achieving all the seep and groundwater RAOs. The integrity of the cap is less susceptible to settlement-induced cracking, freeze/thaw cycles, erosion, and biointrusion than a soil cover and is more reliable. It is expected that minor maintenance will be necessary to correct vegetation and soil loss due to erosion. A low permeability cap is implementable as a well known technology, and is expected to be effective in the long-term. The passive storm water controls will require minimal maintenance to ensure proper functioning thereby lending permanence to the remedial action.

#### **11.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT**

The presumptive remedy approach for municipal-type landfills utilizes the remedial approach of containment of wastes rather than treatment of wastes. The selected interim remedy is expected to reduce the toxicity and mobility of the waste, and minimize the generation of new leachate. By minimizing infiltration of rain water into the landfill, the height of the leachate mound in Zone 1 will fall. As more of the waste becomes unsaturated, the rate of "natural" biological degradation of the waste is expected to increase. Because this interim action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element may be addressed by the final response action.

#### **12.0 DOCUMENTATION OF SIGNIFICANT CHANGES**

The Proposed Plan for Interim Remedial Action for the Tulalip Landfill Superfund Site was released for public comment on August 7, 1995. The Plan identified Alternative 4c, Geosynthetic Cover with Passive Drainage, as the preferred alternative for interim remedial action. The public comment period closed on October 25, 1995. EPA has considered, at some point in the CERCLA process, all of the remedy alternatives that have ever been submitted to EPA by the Respondents, including Alternatives 2b and 2b(ii), which were submitted after the Source Area Containment Feasibility Study was approved by EPA. After the close of the public comment period, EPA re-considered and re-evaluated all of the alternatives, including those alternatives which do not include a landfill cover. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of this information, including these comments, it was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary.



Several non-significant changes occurred between issuance of the Proposed Plan and the signing of this interim ROD, none of which required any modifications to the preferred remedy as described in the Proposed Plan. For example:

- The Proposed Plan stated that Alternative 2b would meet RAOs. However, upon review of public comments, additional, more recent technical information,<sup>46</sup> and EPA's re-evaluation of all the remedial alternatives, EPA determined that Alternative 2b does not meet all of the RAOs that have been identified for the interim remedial action.
- The ATSDR Preliminary Public Health Assessment for Tulalip Landfill (June, 1993), which was inadvertently omitted from the Administrative Record, was added to the Administrative Record after the public comment period. However, EPA did not rely on the information in the Preliminary Report because of the preliminary nature of the report, and because all of the data on which the report was based was collected prior to the RI.
- In accordance with the NCP, EPA has added some documents to the Administrative Record that were generated or received by EPA during or after the public comment period on the Proposed Plan.
- After the 80-day public comment period on the Proposed Plan ended on October 25, 1995, EPA received several letters from the Respondents transmitting late comments on the Proposed Plan. EPA has added these late comments to the Administrative Record for this interim ROD. However, in accordance with the requirements of the NCP, EPA has determined that, based on EPA's review of the late comments, modification of the preferred remedy as described in the Proposed Plan was not necessary nor appropriate. EPA has not provided written responses to the Respondents' late comments.
- EPA made minor modifications to some of the RAOs as they were described in the Proposed Plan. EPA added an RAO ("Minimize Infiltration") based on the recommendation of EPA Presumptive Remedy guidance. See Section 7.0.

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<sup>46</sup> See "Comparison of the Leachate Collection and Treatment Alternative (2B) with the FML Cover Alternative (4C)," Golder, October, 1995; Memorandum, Keith Pine of Weston to Eric Winiecki of EPA, February 7, 1996. See also Memorandum, Eric Winiecki to The File, August 4, 1995, re: EPA Review of Alternative 2b - Treatment Berm; Section 9.0 and Appendices A, D and E of this interim ROD.



- Interim ROD Tables 6-1 and 6-2 and Figure 6-1 were updated from the Streamlined Risk Assessment based on changes EPA has made to the Region 3 risk-based concentrations for soil ingestion since the development of the Streamlined Risk Assessment.

EPA does not consider any of these changes to be significant.



Table 1-1: Species of Concern

Species	Distance from Site (if available)	State Status	Federal Status
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Within 1/4 mile	T	T
Osprey ( <i>Pandion haliaetus</i> )	Within 1/4 mile	M	--
Great Blue Heron ( <i>Ardea herodias</i> )	Within 1/4 mile	M	--
Arctic Tern ( <i>Sterna paradisaea</i> )	Within 1/4 mile	M	--
Harbor Seal ( <i>Phoca vitulina</i> )	---	M	--
California Sea Lion ( <i>Zalophus californicus</i> )	---	M	--
Stellar (northern) Sea Lion ( <i>Eumetopias jubatus</i> )	---	T	T
Dall's Porpoise ( <i>Phocoenoides dalli</i> )	---	M	--
Pacific Harbor Porpoise ( <i>Phocoena phocoena</i> )	---	C	--
Bull Trout ( <i>Salvelinus confluentus</i> )	---	--	C
Bellers Ground Beetle ( <i>Agonum belleri</i> )	Within 4 miles	C	C
Yuma Myotis ( <i>Myotis yumanensis</i> )	Within 4 miles	--	C
Black Lily ( <i>Fritillaria camschatcensis</i> )	Within 4 miles	S	--
Water Lobelia ( <i>Lobelia dortmanna</i> )	Within 15 miles	S	--
Choriso Bog-Orchid ( <i>Platanthera chorisiana</i> )	Within 15 miles	T	--

T = Threatened

M = Monitored

C = Candidate for Listing

S = Sensitive

Sources: December, 1987, letter from U.S. Fish and Wildlife Service to Jerry Lee, E&E.  
 December, 1987, letter from Washington Department of Wildlife to Jerry Lee, E&E.  
 January, 1988, letter from Washington Department of Natural Resources to Jerry Lee, E&E.  
 Preliminary Natural Resource Survey, Tulalip Landfill, Marysville, Washington,  
 National Oceanic and Atmospheric Administration (NOAA), 1991.  
 February 6, 1996, letter from NOAA to Eric Winiecki, EPA.



Table 5-1

## Chemicals Detected in On-Source and Off-Source Media

Analyte	On-Source Media				Off-Source Media						
	Zone 1 Groundwater	Zone 2 Groundwater	Surface Water	Surface Soil	Surface Soil	Subsurface Soil	Surface Water	Leachate Seep <sup>1</sup>	Surface Sediment	Subsurface Sediment	Fish Tissue
<b>VOCs</b>											
1,1-Dichloroethane		X						X			
2-Butanone		X									
2-Hexanone		X									
4-Methyl-2-Pentanone								X			
Acetone		X	X				X	X			
Benzene	X	X	X					X			
Butylbenzene								X			
Carbon Disulfide		X									
Chlorobenzene	X	X	X					X			
Chloroethane								X			
Chloroform		X									
Chloromethane	X	X					X	X			
cis-1,2-Dichloroethene								X			
Ethylbenzene	X	X	X					X			
Methylene Chloride		X						X			
Toluene	X	X	X					X			
Total Xylenes	X	X	X					X			
Trichloroethene			X								
<b>BNAs</b>											
1,2,4-Trichlorobenzene								X			
1,2-Dichlorobenzene	X							X			
1,3-Dichlorobenzene	X							X			
1,4-Dichlorobenzene	X	X	X		X	X		X			
2,4-Dichlorophenol			X					X			
2,4-Dimethylphenol	X		X		X	X		X			
1-Methylnaphthalene					X	X					
2-Methylnaphthalene	X	X	X		X	X		X	X	X	
2-Methylphenol	X							X			
3,3'-Dichlorobenzidine								X			
4-Chloro-3-methylphenol	X	X			X	X		X	X	X	
4-Methylphenol				X							
4-Nitrophenol					X	X		X	X	X	
Acenaphthylene					X	X		X	X	X	
Acenaphthene	X	X	X		X	X		X	X	X	
Anthracene	X	X			X	X		X	X	X	
Benzo(a)anthracene			X		X	X		X	X	X	
Benzo(a)pyrene		X			X	X		X	X	X	
Benzo(b)fluoranthene					X	X		X	X	X	
Benzo(g,h,i)perylene					X	X		X	X	X	
Benzo(k)fluoranthene					X	X		X	X	X	
Benzoic acid								X	X	X	



## Chemicals Detected in On-Source and Off-Source Media (Continued)

Analyte	On-Source Media				Off-Source Media						
	Zone 1 Groundwater	Zone 2 Groundwater	Surface Water	Surface Soil	Surface Soil	Subsurface Soil	Surface Water	Leachate Seep <sup>1</sup>	Surface Sediment	Subsurface Sediment	Fish Tissue
bis(2-Chloroethyl)ether									X		
bis(2-Ethylhexyl)phthalate		X	X	X	X	X	X	X	X	X	
Butylbenzylphthalate					X						
Carbazole					X	X		X	X	X	
Chrysene			X	X	X	X		X	X	X	
Di-n-butylphthalate		X			X			X		X	
Di-n-octylphthalate			X	X	X	X		X			
Dibenz(a,h)anthracene					X		X	X	X	X	
Dibenzofuran	X	X	X		X	X		X	X	X	
Diethylphthalate	X	X						X			
Dimethylphthalate					X						
Fluoranthene	X	X	X	X	X	X		X	X	X	
Fluorene	X	X	X	X	X	X		X	X	X	
Indeno(1,2,3-cd)pyrene					X	X		X	X	X	
n-Nitroso-diphenylamine	X				X	X		X			
n-Nitroso-di-n-propylamine				X							
Naphthalene	X	X	X	X	X	X		X	X	X	
Pentachlorophenol						X					
Phenanthrene	X	X	X	X	X	X		X	X	X	
Phenol	X	X			X			X	X		
Pyrene		X	X	X	X	X		X	X	X	
<b>PCB/Pesticides</b>											
4,4'-DDD					X	X		X	X	X	
4,4'-DDE					X			X	X	X	
4,4'-DDT					X	X		X	X	X	
Aldrin					X			X			
Aroclor-1016								X			
Aroclor-1232					X	X					
Aroclor-1242					X						
Aroclor-1248					X	X		X			
Aroclor-1254					X	X					X
Aroclor-1260									X		
alpha-BHC					X			X	X	X	
beta-BHC	X	X			X			X	X	X	
delta-BHC					X	X		X	X	X	
gamma-BHC (Lindane)	X				X			X	X	X	
Dieldrin					X			X	X	X	
Endosulfan I								X	X		
Endosulfan II		X			X			X			
Endosulfan sulfate								X	X	X	
Endrin					X			X		X	
Endrin aldehyde		X			X	X			X		
Endrin ketone					X	X			X		



**Chemicals Detected in On-Source and Off-Source Media (Continued)**

Analyte	On-Source Media				Off-Source Media						
	Zone 1 Groundwater	Zone 2 Groundwater	Surface Water	Surface Soil	Surface Soil	Subsurface Soil	Surface Water	Leachate Seep <sup>1</sup>	Surface Sediment	Subsurface Sediment	Fish Tissue
gamma-chlordane								X			
Heptachlor		X			X			X	X	X	
Heptachlor epoxide	X				X	X		X	X		
Methoxychlor								X			
<b>INORGANICS</b>											
Aluminum	X	X	X		X	X	X	X	X	X	X
Antimony	X	X	X		X	X	X	X	X	X	X
Arsenic	X	X	X		X	X	X	X	X	X	X
Barium	X	X	X		X	X			X	X	
Beryllium	X	X	X		X	X		X	X	X	X
Cadmium	X	X	X		X	X	X	X	X	X	X
Calcium	X	X	X		X	X		X	X	X	X
Chromium	X	X	X		X	X		X	X	X	X
Cobalt	X	X	X		X	X		X	X	X	X
Copper	X	X	X		X	X		X			
Cyanide	X	X	X		X	X	X	X	X	X	X
Iron	X	X	X		X	X	X	X	X	X	X
Lead	X	X	X		X	X	X	X	X	X	X
Magnesium	X	X	X		X	X	X	X	X	X	X
Manganese		X			X	X		X	X	X	X
Mercury	X	X	X		X	X		X	X	X	X
Nickel	X	X	X		X	X	X	X	X	X	X
Potassium		X			X	X		X	X		X
Selenium					X				X		X
Silver		X	X		X	X	X	X	X	X	
Sodium	X	X				X		X			
Thallium	X	X	X		X	X		X	X	X	X
Vanadium	X	X	X		X	X	X	X	X	X	
Zinc								X			
<b>CONVENTIONALS</b>											
Ammonia Nitrogen	X	X									

<sup>1</sup> Summary of on-source and off-source leachate seeps.



**Table 6-1**  
**Comparison Numbers Used for the Human Health Evaluation**

Analyte	Soil/Sediment <sup>1</sup>			Surface water <sup>4</sup>	
	EPA <sup>2</sup>	MTCA <sup>3</sup>	Units		Units
<b>VOCs</b>					
1,1-Dichloroethane	200,000,000.00	32,000,000.00	ug/kg	N/A	ug/L
4-Methyl-2-Pentanone	N/A	N/A	ug/kg	N/A	ug/L
Acetone	200,000,000.00	32,000,000.00	ug/kg	N/A	ug/L
Benzene	200,000.00	1,400,000.00	ug/kg	71.00	ug/L
Butylbenzene	20,000,000.00	N/A	ug/kg	N/A	ug/L
Chlorobenzene	41,000,000.00	6,400,000.00	ug/kg	21,000.00	ug/L
Chloroethane	820,000,000.00	N/A	ug/kg	N/A	ug/L
Chloromethane	440,000.00	3,100,000.00	ug/kg	N/A	ug/L
cis-1,2-Dichloroethene	20,000,000.00	3,200,000.00	ug/kg	N/A	ug/L
Ethylbenzene	200,000,000.00	32,000,000.00	ug/kg	29,000.00	ug/L
Methylene Chloride	760,000.00	5,300,000.00	ug/kg	1,600.00	ug/L
Toluene	410,000,000.00	64,000,000.00	ug/kg	200,000.00	ug/L
Total Xylenes	1,000,000,000.00	640,000,000.00	ug/kg	N/A	ug/L
Trichloroethene	520,000.00	3,600,000.00	ug/kg	81.00	ug/L
<b>BNAs</b>					
1-Methylnaphthalene	N/A	N/A	ug/kg	N/A	ug/L
1,2-Dichlorobenzene	180,000,000.00	29,000,000.00	ug/kg	17,000.00	ug/L
1,2,4-Trichlorobenzene	20,000,000.00	3,200,000.00	ug/kg	N/A	ug/L
1,3-Dichlorobenzene	180,000,000.00	N/A	ug/kg	2,600.00	ug/L
1,4-Dichlorobenzene	240,000.00	1,700,000.00	ug/kg	2,600.00	ug/L
2-Methylnaphthalene	N/A	N/A	ug/kg	N/A	ug/L
2-Methylphenol	100,000,000.00	N/A	ug/kg	N/A	ug/L
2,4-Dichlorophenol	6,100,000.00	960,000.00	ug/kg	790.00	ug/L
2,4-Dimethylphenol	41,000,000.00	6,400,000.00	ug/kg	N/A	ug/L
3,3'-Dichlorobenzidine	13,000.00	89,000.00	ug/kg	0.077	ug/L
4-Chloro-3-methylphenol	N/A	N/A	ug/kg	N/A	ug/L
4-Methylphenol	10,000,000.00	N/A	ug/kg	N/A	ug/L
4-Nitrophenol	130,000,000.00	N/A	ug/kg	N/A	ug/L
Acenaphthylene	N/A	N/A	ug/kg	N/A	ug/L
Acenaphthene	120,000,000.00	19,000,000.00	ug/kg	N/A	ug/L
Anthracene	610,000,000.00	96,000,000.00	ug/kg	110,000.00	ug/L
Benz(a)anthracene	7,800.00	5,500.00	ug/kg	0.031	ug/L
Benzo(a)pyrene	780.00	5,500.00	ug/kg	0.031	ug/L
Benzo(b)fluoranthene	7,800.00	5,500.00	ug/kg	0.031	ug/L
Benzo(g,h,i)perylene	N/A	N/A	ug/kg	N/A	ug/L
Benzo(k)fluoranthene	78,000.00	5,500.00	ug/kg	0.031	ug/L
Benzoic acid	1,000,000,000.00	1,300,000,000.00	ug/kg	N/A	ug/L
bis(2-Chloroethyl)ether	5,200.00	36,000.00	ug/kg	1.40	ug/L
bis(2-Ethylhexyl)phthalate	410,000.00	2,900,000.00	ug/kg	5.90	ug/L
Butylbenzylphthalate	410,000,000.00	64,000,000.00	ug/kg	N/A	ug/L
Carbazole	N/A	2,000,000.00	ug/kg	N/A	ug/L
Chrysene	780,000.00	5,500.00	ug/kg	0.031	ug/L
Di-n-butylphthalate	200,000,000.00	32,000,000.00	ug/kg	12,000.00	ug/L
Di-n-octylphthalate	41,000,000.00	6,400,000.00	ug/kg	N/A	ug/L
Dibenz(a,h)anthracene	780.00	5,500.00	ug/kg	0.031	ug/L



Table 6-1 - page 2

Analyte	Soil/Sediment <sup>1</sup>			Surface water <sup>4</sup>	
	EPA <sup>2</sup>	MTCA <sup>3</sup>	Units		Units
Dibenzofuran	8,200,000.00	N/A	ug/kg	N/A	ug/L
Diethylphthalate	1,000,000,000.00	260,000,000.00	ug/kg	120,000.00	ug/L
Dimethylphthalate	1,000,000,000.00	320,000,000.00	ug/kg	2,900,000.00	ug/L
Fluoranthene	82,000,000.00	13,000,000.00	ug/kg	370.00	ug/L
Fluorene	82,000,000.00	13,000,000.00	ug/kg	14,000.00	ug/L
Indeno(1,2,3-cd)pyrene	7,800.00	5,500.00	ug/kg	0.031	ug/L
n-Nitroso-di-n-propylamine	820.00	5,700.00	ug/kg	N/A	ug/L
n-Nitrosodiphenylamine	1,200,000.00	8,200,000.00	ug/kg	16.00	ug/L
Naphthalene	82,000,000.00	1,300,000.00	ug/kg	N/A	ug/L
Pentachlorophenol	48,000.00	330,000.00	ug/kg	8.20	ug/L
Phenanthrene	N/A	N/A	ug/kg	N/A	ug/L
Phenol	1,000,000,000.00	190,000,000.00	ug/kg	4,600,000.00	ug/L
Pyrene	61,000,000.00	9,600,000.00	ug/kg	11,000.00	ug/L
<b>PCB/Pesticides</b>					
4,4'-DDD	24,000.00	170,000.00	ug/kg	0.00084	ug/L
4,4'-DDE	17,000.00	120,000.00	ug/kg	0.00059	ug/L
4,4'-DDT	17,000.00	120,000.00	ug/kg	0.00059	ug/L
Aldrin	340.00	2,400.00	ug/kg	0.00014	ug/L
alpha-BHC	910.00	6,400.00	ug/kg	0.013	ug/L
Aroclor-1016	140,000.00	22,000.00	ug/kg	0.00005	ug/L
Aroclor-1232	740.00 <sup>a</sup>	5,200.00 <sup>a</sup>	ug/kg	0.00005	ug/L
Aroclor-1242	740.00 <sup>a</sup>	5,200.00 <sup>a</sup>	ug/kg	0.00005	ug/L
Aroclor-1248	740.00 <sup>a</sup>	5,200.00 <sup>a</sup>	ug/kg	0.00005	ug/L
Aroclor-1254	41,000.00	5,200.00 <sup>a</sup>	ug/kg	0.00005	ug/L
Aroclor-1260	740.00 <sup>a</sup>	5,200.00 <sup>a</sup>	ug/kg	0.00005	ug/L
beta-BHC	3,200.00	22,000.00	ug/kg	0.05	ug/L
delta-BHC	N/A	N/A	ug/kg	N/A	ug/L
gamma-BHC (Lindane)	4,400.00	31,000.00	ug/kg	0.063	ug/L
Dieldrin	360.00	2,500.00	ug/kg	0.00014	ug/L
Endosulfan I	12,000,000.00 <sup>b</sup>	N/A	ug/kg	2.00	ug/L
Endosulfan II	12,000,000.00 <sup>b</sup>	N/A	ug/kg	2.00	ug/L
Endosulfan sulfate	N/A	N/A	ug/kg	2.00	ug/L
Endrin	610,000.00	96,000.00	ug/kg	0.81	ug/L
Endrin aldehyde	N/A	N/A	ug/kg	0.81	ug/L
Endrin ketone	N/A	N/A	ug/kg	N/A	ug/L
gamma-chlordane	4,400.00 <sup>c</sup>	30,800.00 <sup>c</sup>	ug/kg	0.00059 <sup>c</sup>	ug/L
Heptachlor	1,300.00	8,900.00	ug/kg	0.00021	ug/L
Heptachlor epoxide	630.00	4,400.00	ug/kg	0.00011	ug/L
Methoxychlor	10,000,000.00	1,600,000.00	ug/kg	N/A	ug/L
<b>INORGANICS<sup>5</sup></b>					
Aluminum	1,000,000.00	N/A	mg/kg	N/A	mg/L
Antimony	820.00	130.00	mg/kg	4.30	mg/L
Arsenic	3.80	57.00	mg/kg	0.00014	mg/L
Barium	140,000.00	22,000.00	mg/kg	N/A	mg/L
Beryllium	1.30	9.30	mg/kg	N/A	mg/L
Cadmium	1,000.00	6.60	mg/kg	N/A	mg/L
Calcium	N/A	N/A	mg/kg	N/A	mg/L



Table 6-1 - page 3

Analyte	Soil/Sediment <sup>1</sup>			Surface water <sup>4</sup>	
	EPA <sup>2</sup>	MTCA <sup>3</sup>	Units		Units
Chromium	10,000.00 <sup>4</sup>	1,600.00 <sup>5</sup>	mg/kg	N/A	mg/L
Cobalt	120,000.00	N/A	mg/kg	N/A	mg/L
Copper	82,000.00	12,000.00	mg/kg	N/A	mg/L
Cyanide	41,000.00	6,400.00	mg/kg	220.00	mg/L
Iron	N/A	N/A	mg/kg	N/A	mg/L
Lead	400.00 <sup>6</sup>	N/A	mg/kg	N/A	mg/L
Magnesium	N/A	N/A	mg/kg	N/A	mg/L
Manganese	10,000.00	45,000.00	mg/kg	N/A	mg/L
Mercury	610.00	96.00	mg/kg	0.00015	mg/L
Nickel	41,000.00 <sup>7</sup>	6,400.00 <sup>7</sup>	mg/kg	4.60	mg/L
Potassium	N/A	N/A	mg/kg	N/A	mg/L
Selenium	10,000.00	1,600.00	mg/kg	N/A	mg/L
Silver	10,000.00	1,600.00	mg/kg	N/A	mg/L
Sodium	N/A	N/A	mg/kg	N/A	mg/L
Thallium	N/A	22.00 <sup>8</sup>	mg/kg	0.0063	mg/L
Vanadium	14,000.00	2,200.00	mg/kg	N/A	mg/L
Zinc	610,000.00	96,000.00	mg/kg	N/A	mg/L

N/A Not Available

<sup>1</sup> The lower of the two values (i.e., EPA or MTCA) was used for screening. This Table has been updated since the streamlined Risk Assessment to reflect recent (1995) revisions to the EPA Region 3 risk-based comparison numbers for soil. Only the soil comparison numbers have been updated.

<sup>2</sup> Values taken from EPA Region III Risk-Based Concentration Table, Fourth Quarter 1994

<sup>3</sup> Values taken from Washington State Department of Ecology's Model Toxics Control Act Cleanup Levels and Risk Calculations Update, January 1995

<sup>4</sup> Values taken from EPA Water Quality Standards; 40 CFR Part 131, December 1992

<sup>5</sup> Regional background soil concentrations of arsenic and beryllium were also used for comparison. These values are 90th percentile concentrations obtained from the Washington State Department of Ecology (Ecology, 1994). The values used were the following:

Arsenic 7.3 mg/kg

Beryllium 0.6 mg/kg

<sup>6</sup> As "polychlorinated biphenyls"

<sup>7</sup> As "endosulfan"

<sup>8</sup> As "chlordane"

<sup>9</sup> As chromium VI

<sup>10</sup> Value taken from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities EPA OSWER Directive #9355.4-12, July, 1994

<sup>11</sup> As "nickel (soluble salts)"

<sup>12</sup> As "thallium, soluble salts"



Table 6-2

**Summary of On-Source and Off-Source Site Data that Exceed  
Human Health Comparison Numbers**

Analyte	Frequency of Exceedences	Range of Exceed. Conc.	Criteria Concentration	Background Concentration	Units	Location of Samples that Exceeded Criteria
<b>Surface Soil<sup>1</sup></b>						
Aroclor-1242	2/106	1000-1900	740	N/A	ug/kg	R1SBSB05A1, R1SBSB09A1
Arsenic	91/93	4.8-47.3	3.8	7.3	mg/kg	Criteria was exceeded at all sample locations <u>except</u> : R1SBSB09D1 and R1SBSB091-S2 Background was exceeded at all locations <u>except</u> : R1SBSB08A1, R1SBSB08B1, R1SBSB08C1, R1SBSB08D1, R1SBSB08E1, R1SBSB08F1, R1SBSB08G1, R1SBSB08I1, R1SBSB09A1, R1SBSB09D1, R1-SB-SB09A1-S2, R1SBSB02A1
Benzo(a)pyrene	3/106	1700-3300	780	N/A	ug/kg	R1-SB-SB06A1-S2, R1SBSB06A1, R1SBSB08I1
Beryllium	2/106	1.70-2.10	1.3	0.6	mg/kg	R1SBSB02C1, R1SBSB02I1
Chrysene	1/106	6000*	5500	N/A	ug/kg	R1SBSB08I1
Heptachlor epoxide	1/106	2800	630	N/A	ug/kg	R1-SB-SB06A1-S2
<b>Subsurface Soil<sup>2</sup></b>						
Aroclor-1242	2/19	990-1100	740	N/A	ug/kg	R1SBSB05A2, R1SBSB06A2,
Arsenic	17/17	4.2-32.4	3.8	7.3	mg/kg	Criteria was exceeded at all sample locations. Background was exceeded at all locations <u>except</u> : R1SBSB07A2 and R1SBSB09A2
Benzo(a)pyrene	3/20	990-1500	780	N/A	ug/kg	R1-SB-SB06A2-S2, R1SBSB06A2, R1SBSB06A3
<b>Surface Water</b>						
Arsenic	1/20	0.0018	0.00014	N/A	mg/L	R1-SW-SG24-S2
Dibenz(a,h)anthracene	1/20	0.04	0.031	N/A	ug/L	R1-SW-SG24-S2
<b>Leachate</b>						
3,3'-Dichlorobenzidine	1/55	0.4	0.077	N/A	ug/L	R3LSSP06
4,4'-DDD	1/33	0.022	0.00084	N/A	ug/L	R6LSSP06
4,4'-DDE	1/33	0.01	0.00059	N/A	ug/L	R6LSSP06
4,4'-DDT	9/36	0.013-0.049	0.00059	N/A	ug/L	R1LSSP09, R3LSSP03, R3LSSP05, R3LSSP06, R6LSSP02, R6LSSP03, R6LSSP06, R6LSSP10, R6LSSP08-S2



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Analyte	Frequency of Exceedences	Range of Exceed. Conc.	Criteria Concentration	Background Concentration	Units	Location of Samples that Exceeded Criteria
Aldrin	9/37	0.007-0.036	0.00014	N/A	ug/L	R1LSSP03, R1LSSP09, R1LSSP11, R2LSSP08, R3LSSP06, R3LSSP09, R3LSSP10, R6LSSP08, R6LSSP10
Aroclor-1016	10/36	0.47-1.2	0.000045	N/A	ug/L	R5LSSP01, R5LSSP02, R5LSSP04, R5LSSP06, R5LSSP11, R6LSSP02, R6LSSP05, R6LSSP06, R6LSSP10, R6LSSP08-S2
Aroclor-1232	8/37	1.2-5.8	0.000045	N/A	ug/L	R5-LS-SP09-S2, R5LSSP03, R5LSSP05, R5LSSP08, R5LSSP09, R5LSSP10, R6LSSP07, R6LSSP08-S2
Aroclor-1254	1/37	1.31	0.000045	N/A	ug/L	R6LSSP08-S2
Arsenic	40/59	0.0019-0.023	0.00014	N/A	mg/L	R1-LS-SP04-3/8, R1-LS-SP04-S2, R1LSSP01, R1LSSP02, R1LSSP03, R1LSSP04, R1LSSP05, R1LSSP06, R1LSSP07, R1LSSP08, R1LSSP11, R2LSSP01, R2LSSP03, R2LSSP05, R2LSSP07, R2LSSP08, R2LSSP11, R3LSSP05, R3LSSP06, R4-LS-SP06-S2, R4-LS-SP06-S2-F, R4LSSP03, R4LSSP05, R5LSSP01, R5LSSP03, R5LSSP04, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6LSSP01, R6LSSP02, R6LSSP03, R6LSSP04, R6LSSP05, R6LSSP06, R6LSSP07, R6LSSP08, R6LSSP11, R6LSSP08-S2
Benz(a)anthracene	3/55	0.27-5	0.031	N/A	ug/L	R1-LS-SP04-S2, R4-LS-SP06-S2, R4LSSP06
Benzo(a)pyrene	1/55	1.4	0.031	N/A	ug/L	R4-LS-SP06-S2
Benzo(b)fluoranthene	1/55	2.2	0.031	N/A	ug/L	R4-LS-SP06-S2
Benzo(k)fluoranthene	1/55	0.7	0.031	N/A	ug/L	R4-LS-SP06-S2
bis(2-Ethylhexyl)phthalate	3/56	6-23.4	5.9	N/A	ug/L	R1LSSP01, R4-LS-SP06-S2, R6-LS-SP08-S2
Chrysene	3/55	0.20-3.5	0.031	N/A	ug/L	R1-LS-SP04-S2, R4-LS-SP06-S2, R4LSSP06
Dibenz(a,h)anthracene	1/55	0.08	0.031	N/A	ug/L	R4-LS-SP06-S2



Table 6-2 - page 3

Analyte	Frequency of Exceedences	Range of Exceed. Conc.	Criteria Concentration	Background Concentration	Units	Location of Samples that Exceeded Criteria
Dieldrin	6/35	0.006-0.02	0.00014	N/A	ug/L	R4LSSP06, R6LSSP03, R6LSSP04, R6LSSP06, R6LSSP08, R6LSSP11
Indeno(1,2,3-cd)pyrene	2/55	0.20-0.38	0.031	N/A	ug/L	R3LSSP03, R4-LS-SP06-S2
gamma-BHC (Lindane)	1/39	0.067	0.063	N/A	ug/L	R1LSSP09
gamma-chlordane	1/33	0.006	0.00059	N/A	ug/L	R6LSSP11
Heptachlor	6/35	0.00899-0.022	0.00021	N/A	ug/L	R1LSSP11, R2LSSP08, R6LSSP02, R6LSSP04, R6LSSP06, R6LSSP10
Heptachlor epoxide	25/43	0.011-0.064	0.00011	N/A	ug/L	R1LSSP03, R1LSSP04, R1LSSP05, R1LSSP07, R2LSSP06, R3LSSP03, R3LSSP05, R3LSSP06, R3LSSP10, R4LSSP03, R4LSSP05, R4LSSP06, R4LSSP09, R4LSSP10, R6LSSP01, R6LSSP02, R6LSSP03, R6LSSP04, R6LSSP05, R6LSSP06, R6LSSP07, R6LSSP08, R6LSSP09, R6LSSP10, R6LSSP11
Mercury	4/50	0.00018-0.00038	0.00015	N/A	mg/L	R1LSSP08, R2LSSP08, R4-LS-SP06-S2 R5LSSP02
Thallium	1/33	0.0085	0.0063	N/A	mg/L	R6LSSP08
<b>Surface sediment</b>						
Arsenic	52/52	8.9-94.4	1.6	N/A	mg/kg	Criteria was exceeded at all sample locations
Benzo(a)pyrene	1/52	570	390	N/A	ug/kg	R1SDSG13
Manganese	1/52	9690	5100	N/A	mg/kg	R1SDSG19
<b>Subsurface sediment</b>						
Arsenic	20/20	8.8-60.9	1.6	N/A	mg/kg	Criteria was exceeded at all sample locations

\* Value exceeded MTCA Method C criteria, but did not exceed EPA criteria

† This table has been updated since the streamlined Risk Assessment to reflect recent (1995) revisions to the EPA Region 3 risk-based comparison numbers for soil. The resulting changes to this table are minor and do not change any of EPA's conclusions in or regarding the streamlined Risk Assessment. Changes in this table include: for site surface soil data, there are no exceedances of Region 3 risk-based soil comparison numbers for Aroclor-1248, benz(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene; the surface soil frequency of exceedance for six other chemicals changed slightly; for subsurface soils, there were slight changes in the reported frequencies of exceedance for some chemicals. However, no chemicals were removed from the list.



**Tab 6-3**  
**Comparison Numbers Used for the Ecological Evaluation**

Analyte	Soil <sup>3</sup>		Sediment			Surface Water-Marine			Surface Water-Fresh <sup>4</sup>		
	Criteria	Units	Criteria	Units	Ref	Criteria	Units	Reference	Criteria	Units	Reference
<b>VOCs</b>											
1,2-Dichloroethane	Not available	ug/kg	Not available	ug/kg-dw		113000	ug/L	AWQC Acute	20000	ug/L	AWQC Chronic
Acetone	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		Not available	ug/L	
Benzene	Not available	ug/kg	Not available	ug/kg-dw		700	ug/L	AWQC Chronic	5300	ug/L	AWQC Acute
Chlorobenzene	Not available	ug/kg	Not available	ug/kg-dw		129	ug/L	AWQC Chronic	50	ug/L	AWQC Chronic
Chloroform	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		1240	ug/L	AWQC Chronic
Ethylbenzene	Not available	ug/kg	10	ug/kg-dw	AET	430	ug/L	AWQC Acute	32000	ug/L	AWQC Acute
Toluene	Not available	ug/kg	Not available	ug/kg-dw		5000	ug/L	AWQC Chronic	17500	ug/L	AWQC Acute
2,4-Dinitrotoluene	Not available	ug/kg	Not available	ug/kg-dw		370	ug/L	AWQC Chronic	230	ug/L	AWQC Chronic
1,1,1-Trichloroethane	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		18000	ug/L	AWQC Acute
1,1,2-Trichloroethane	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		9400	ug/L	AWQC Chronic
1,1,2,2-Tetrachloroethane	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		2400	ug/L	AWQC Chronic
Carbon Tetrachloride	Not available	ug/kg	Not available	ug/kg-dw		50000	ug/L	AWQC Acute	35200	ug/L	AWQC Acute
Chloromethane	Not available	ug/kg	Not available	ug/kg-dw		6400	ug/L	AWQC Chronic	11000	ug/L	AWQC Acute
cis-1,2-Dichloroethene	Not available	ug/kg	Not available	ug/kg-dw		224000	ug/L	AWQC Acute	11600	ug/L	AWQC Acute
trans-1,2-Dichloroethene	Not available	ug/kg	Not available	ug/kg-dw		224000	ug/L	AWQC Acute	11600	ug/L	AWQC Acute
Tetrachloroethene	Not available	ug/kg	Not available	ug/kg-dw		450	ug/L	AWQC Chronic	840	ug/L	AWQC Chronic
Trichloroethene	Not available	ug/kg	Not available	ug/kg-dw		2000	ug/L	AWQC Chronic	21900	ug/L	AWQC Chronic
<b>BNAs</b>											
1,2,4-Trichlorobenzene	Not available	ug/kg	51	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
1,2-Dichlorobenzene	Not available	ug/kg	50	ug/kg-dw	AET	1970	ug/L	AWQC Acute	763	ug/L	AWQC Chronic
1,3-Dichlorobenzene	Not available	ug/kg	170	ug/kg-dw	AET	1970	ug/L	AWQC Acute	763	ug/L	AWQC Chronic
1,4-Dichlorobenzene	Not available	ug/kg	110	ug/kg-dw	AET	1970	ug/L	AWQC Acute	763	ug/L	AWQC Chronic
2,4-Dimethylphenol	Not available	ug/kg	29	ug/kg-dw	AET	Not available	ug/L		2120	ug/L	AWQC Acute
2-Methylnaphthalene	2.6	ug/kg	670	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
2-Methylphenol	Not available	ug/kg	63	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
4-Methylphenol	Not available	ug/kg	670	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
Acenaphthylene	1100	ug/kg	1300	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Acenaphthene	1100	ug/kg	500	ug/kg-dw	AET	710	ug/L	AWQC Chronic	520	ug/L	AWQC Chronic
Anthracene	56000	ug/kg	960	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzo(a)anthracene	56000	ug/kg	1600	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzo(a)pyrene	56000	ug/kg	1600	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzo(b)fluoranthene	56000	ug/kg	3600	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzo(k)fluoranthene	11000	ug/kg	3600	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzo(g,h,i)perylene	56000	ug/kg	720	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Benzoic acid	Not available	ug/kg	650	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
bis(2-Ethylhexyl)phthalate	6500	ug/kg	1300	ug/kg-dw	AET	360	ug/L	AWQC Chronic	160	ug/L	AWQC Chronic
Butylbenzylphthalate	160000	ug/kg	900	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
Chrysene	56000	ug/kg	2800	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Di-n-butylphthalate	14000	ug/kg	1400	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
Di-n-octylphthalate	Not available	ug/kg	6200	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	



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Analyte	Soil <sup>3</sup>		Sediment			Surface Water-Marine			Surface Water-Fresh <sup>4</sup>		
	Criteria	Units	Criteria	Units	Ref	Criteria	Units	Reference	Criteria	Units	Reference
Dibenz(a,h)anthracene	1100	ug/kg	230	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Dibenzofuran	Not available	ug/kg	540	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
Diethylphthalate	220000	ug/kg	200	ug/kg-dw	AET	Not available	ug/L		Not available	ug/L	
Fluoranthene	56000	ug/kg	2500	ug/kg-dw	AET	16	ug/L	AWQC Chronic	3980	ug/L	AWQC Acute
Fluorene	1100	ug/kg	540	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
Indeno(1,2,3-cd)pyrene	56000	ug/kg	690	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
n-Nitrosodiphenylamine	Not available	ug/kg	28	ug/kg-dw	AET	3300000	ug/L	AWQC Acute	5850	ug/L	AWQC Acute
Naphthalene	3900	ug/kg	2100	ug/kg-dw	AET	2350	ug/L	AWQC Acute	620	ug/L	AWQC Chronic
Pentachlorophenol	320	ug/kg	360	ug/kg-dw	AET	7.9	ug/L	AWQC Chronic	13.0	ug/L	AWQC Chronic
Phenanthrene	20000	ug/kg	1500	ug/kg-dw	AET	4.6	ug/L	AWQC Chronic /p/	6.3	ug/L	AWQC Chronic /p/
Phenol	Not available	ug/kg	420	ug/kg-dw	AET	5800	ug/L	AWQC Acute	2560	ug/L	AWQC Chronic
Pyrene	56000	ug/kg	3300	ug/kg-dw	AET	300	ug/L	AWQC Acute	Not available	ug/L	
4-Chlorophenol	Not available	ug/kg	Not available	ug/kg-dw		29700	ug/L	AWQC Acute	Not available	ug/L	
2-Chlorophenol	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		4380	ug/L	AWQC Acute
Hexachlorobutadiene	Not available	ug/kg	Not available	ug/kg-dw		32	ug/L	AWQC Acute	9.3	ug/L	AWQC Chronic
Hexachlorocyclopentadiene	Not available	ug/kg	Not available	ug/kg-dw		7	ug/L	AWQC Acute	5.2	ug/L	AWQC Chronic
Hexachloroethane	Not available	ug/kg	Not available	ug/kg-dw		940	ug/L	AWQC Acute	540	ug/L	AWQC Chronic
Hexachlorobenzene	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		3.68	ug/L	AWQC Chronic /p/
Isophorone	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		117000	ug/L	AWQC Acute
4-Chloro-3-methylphenol	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		30	ug/L	AWQC Acute
2,4,5-Trichlorophenol	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		63	ug/L	AWQC Chronic /p/
2,4,6-Trichlorophenol	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		970	ug/L	AWQC Chronic
2,4-Dichlorophenol	Not available	ug/kg	Not available	ug/kg-dw		Not available	ug/L		365	ug/L	AWQC Chronic
<b>PCBs/Pesticides</b>											
4,4'-DDD	Not available	ug/kg	16	ug/kg-dw	AET	3.6	ug/L	AWQC Acute	0.6	ug/L	AWQC Acute
4,4'-DDE	Not available	ug/kg	9	ug/kg-dw	AET	14	ug/L	AWQC Acute	1050	ug/L	AWQC Acute
4,4'-DDT	6.5	ug/kg	34	ug/kg-dw	AET	0.001	ug/L	AWQC Chronic	0.001	ug/L	AWQC Chronic
Aldrin	Not available	ug/kg	Not available	ug/kg-dw		0.0019	ug/L	WA State Chronic	0.0019	ug/L	WA State Chronic
PCBs <sup>1</sup>	170	ug/kg	1000	ug/kg-dw	AET	0.03	ug/L	AWQC Chronic	0.014	ug/L	AWQC Chronic
Dieldrin	11	ug/kg	Not available	ug/kg-dw		0.0019	ug/L	AWQC Chronic	0.0019	ug/L	AWQC Chronic
Endosulfan II	Not available	ug/kg	Not available	ug/kg-dw		0.0087	ug/L	AWQC Chronic	0.056	ug/L	AWQC Chronic
Endrin	Not available	ug/kg	Not available	ug/kg-dw		0.0023	ug/L	AWQC Chronic	0.0023	ug/L	AWQC Chronic
gamma-BHC (Lindane)	Not available	ug/kg	Not available	ug/kg-dw		0.16	ug/L	AWQC Acute	0.08	ug/L	AWQC Chronic
Heptachlor	Not available	ug/kg	Not available	ug/kg-dw		0.0036	ug/L	AWQC Chronic	0.0038	ug/L	AWQC Chronic
Heptachlor epoxide	Not available	ug/kg	Not available	ug/kg-dw		0.0036	ug/L	AWQC Chronic	0.0038	ug/L	AWQC Chronic
Methoxychlor	Not available	ug/kg	Not available	ug/kg-dw		0.03	ug/L	AWQC Chronic	0.03	ug/L	AWQC Chronic
Chlordane	Not available	ug/kg	Not available	ug/kg-dw		0.034	ug/L	AWQC Chronic	0.0043	ug/L	AWQC Chronic
Endosulfan I	Not available	ug/kg	Not available	ug/kg-dw		0.0087	ug/L	AWQC Chronic	0.056	ug/L	AWQC Chronic
Toxaphene	Not available	ug/kg	Not available	ug/kg-dw		0.0002	ug/L	AWQC Chronic	0.0002	ug/L	AWQC Chronic
alpha-BHC	Not available	ug/kg	Not available	ug/kg-dw		0.34	ug/L	AWQC Acute	100	ug/L	AWQC Acute
beta-BHC	Not available	ug/kg	Not available	ug/kg-dw		0.34	ug/L	AWQC Acute	100	ug/L	AWQC Acute



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Analyte	Soil <sup>3</sup>		Sediment		Ref	Surface Water-Marine			Surface Water-Fresh <sup>4</sup>		
	Criteria	Units	Criteria	Units		Criteria	Units	Reference	Criteria	Units	Reference
	Not available	ug/kg	Not available	ug/kg dw		0.34	ug/L	AWQC Acute	100	ug/L	AWQC Acute
delta BHC						Dissolved/Total			Dissolved/Total		
INORGANICS <sup>2</sup>						Not available	mg/L		Not available	mg/L	
Aluminum	50	mg/kg	Not available	mg/kg-dw		0.5	mg/L	AWQC Chronic /p/	0.03	mg/L	AWQC Chronic /p/
Antimony	5	mg/kg	150	mg/kg-dw	AET	0.036	mg/L	AWQC Chronic	0.19	mg/L	AWQC Chronic
Arsenic	30	mg/kg	57	mg/kg-dw	AET	Not available	mg/L		Not available	mg/L	
Barium	500	mg/kg	Not available	mg/kg-dw		Not available	mg/L		0.0053	mg/L	AWQC Chronic
Beryllium	10	mg/kg	Not available	mg/kg-dw		0.0093	mg/L	AWQC Chronic	0.001/0.0011	mg/L	AWQC Chronic
Cadmium	5	mg/kg	5.1	mg/kg-dw	AET	0.05/0.05	mg/L	AWQC Chronic	0.01/0.11	mg/L	AWQC Chronic
Chromium (V1)	100	mg/kg	260	mg/kg-dw	AET	Not available	mg/L		Not available	mg/L	
Cobalt	50	mg/kg	Not available	mg/kg-dw		0.0024/0.0029	mg/L	AWQC Chronic	0.011/0.012	mg/L	AWQC Chronic
Copper	100	mg/kg	390	mg/kg-dw	AET	0.001	mg/L	AWQC Acute	0.0052	mg/L	AWQC Chronic
Cyanide	Not available	mg/kg	Not available	mg/kg-dw		Not available	mg/L		1.0	mg/L	AWQC Chronic
Iron	Not available	mg/kg	Not available	mg/kg-dw		0.056/0.0085	mg/L	AWQC Chronic	0.0025/0.0032	mg/L	AWQC Chronic
Lead	200	mg/kg	450	mg/kg-dw	AET	Not available	mg/L		Not available	mg/L	
Manganese	1200	mg/kg	Not available	mg/kg-dw		0.00025	mg/L	AWQC Chronic	0.000012	mg/L	AWQC Chronic
Mercury	2	mg/kg	0.59	mg/kg-dw	AET	0.0082/0.0083	mg/L	AWQC Chronic	0.16	mg/L	AWQC Chronic
Nickel	100	mg/kg	140	mg/kg-dw	AET	0.071	mg/L	AWQC Chronic	0.005	mg/L	AWQC Chronic
Selenium	10	mg/kg	Not available	mg/kg-dw		0.0023	mg/L	AWQC Chronic /p/	0.0019/0.00092	mg/L	AWQC Acute /p/
Silver	2	mg/kg	6.1	mg/kg-dw	AET	2.13	mg/L	AWQC Acute	0.04	mg/L	AWQC Chronic
Thallium	1	mg/kg	Not available	mg/kg-dw		Not available	mg/L		Not available	mg/L	
Vanadium	60	mg/kg	Not available	mg/kg-dw		0.0081/0.086	mg/L	AWQC Chronic	0.11	mg/L	AWQC Chronic
Zinc	67	mg/kg	410	mg/kg-dw	AET						
CONVENTIONALS						0.035	mg/L	WA State Chronic	0.045	mg/L	WA State Chronic
Ammonia	Not available	mg/L	Not Available	mg/kg-dw							

<sup>1</sup>Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260

<sup>2</sup>AWQC criteria for inorganics are the same for dissolved or total metals except where a slash indicates otherwise. In this case, the first value is the dissolved criterion value.

<sup>3</sup>Soil references listed in Table A-1. Regional background values were also compared to exceedances for inorganics.

<sup>4</sup>All AWQC calculations are based on a pH of 7.8 and hardness of 100 ppm CaCO<sub>3</sub>.

/p/ proposed criteria



**Table 6-4**  
**Summary of On-Source Data that Exceed**  
**Ecological Comparison Numbers**

Analyte	Frequency of Exceedances <sup>1</sup>	Range of Exceed. Conc.	Criteria Value	Units	Sample ID of Criteria Exceedances
<b>Surface Soil</b>					
bis(2-Ethylhexyl)phthalate	1/5	7200	6500	µg/kg	EE01-SS-P2
<b>Surface Water</b>					
Phenanthrene	1/5	14	6.3	µg/L	EE01-SW-P1
Cadmium-total	1/5	0.011	0.0011	mg/L	EE01-SW-P3
Chromium-total	2/5	0.938-0.95	0.21	mg/L	EE01-SW-P1, EE01-SW-P2
Lead-total	2/5	0.428-0.486	0.0032	mg/L	EE01-SW-P1, EE01-SW-P2
Nickel-total	3/5	0.36-0.856	0.16	mg/L	EE01-SW-P1, EE01-SW-P3, EE01-SW-P4
bis(2-ethylhexyl)phthalate	1/5	180	160.0	ug/L	EE01-SW-P2
Copper-total	4/5	0.0145-0.337	0.012	mg/L	EE01-SW-P1, EE01-SW-P2, EE01-SW-P3, EE01-SW-P4
Iron-total	5/5	2.79-44.4	1.0	mg/L	EE01-SW-P1, EE01-SW-P2, EE01-SW-P3, EE01-SW-P4, EE01-SW-P5
Zinc-total	4/5	0.506-1.73	0.11	mg/L	EE01-SW-P1, EE01-SW-P2, EE01-SW-P3, EE01-SW-P4
<b>Zone 1 Groundwater</b>					
Chromium-total	1/4	0.165	0.05	mg/L	R1GWTB10
Chromium-dissolved	1/2	0.153	0.05	mg/L	R1GWTB10
Copper-total	2/4	0.0139-0.0395	0.0029	mg/L	R1GWMW23, R1GWTB10
Cyanide-total	2/4	0.011-0.016	0.001	mg/L	R1GWMW21, R1GWTB10
Lead-total	3/4	0.033-0.141	0.0085	mg/L	R1GWMW21, R1GWMW23, R1GWTB10
Nickel-total	1/4	0.0349	0.0083	mg/L	R1GWTB10
Nickel-dissolved	1/2	0.0277	0.0082	mg/L	R1GWTB10



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Analyte	Frequency of Exceedances <sup>1</sup>	Range of Exceed. Conc.	Criteria Value	Units	Sample ID of Criteria Exceedances
Zinc-total	2/4	0.0896-0.961	0.086	mg/L	R1GWMW21, R1GWTB10
Heptachlor Epoxide	2/4	0.027-0.049	0.0036	µg/L	R1GWMW22, R1GWMW23
Phenanthrene	1/4	12	4.6	µg/L	R1GWMW23
Ammonia nitrogen	4/4	12-94	0.035	mg/L	R1GWMW21, R1GWMW22, R1GWMW23, R1GWTB10
<b>Zone 2 Groundwater</b>					
Heptachlor	1/22	0.025	0.0036	µg/L	R1GWMW14-S2
Endosulfan II	1/22	0.033	0.0087	µg/L	R1GWMW14-S2
Zinc-total	1/87	0.1	0.086	mg/L	R1GWMW14-S2
Mercury-total	1/86	0.00021	0.000025	mg/L	R6GWMW08-S2
Copper-total	4/87	0.003-0.0069	0.0029	mg/L	R4GWMW02, R4GWMW08, R4GWTB06, R6GWMW08-S2
Chromium-total	12/87	0.066-0.984	0.05	mg/L	R1GWMW14-S2, R1GWMW14, R1GWMW15, R1GWTB06, R2GWTB06, R3GWMW07-S2, R3GWMW07, R3GWTB06, R4GWTB06-S2, R4GWTB06, R5GWTB06, R6GWTB06
Lead-total	8/87	0.0097-0.149	0.0085	mg/L	R1GWMW14-S2, R1GWMW14, R2GWMW04, R3GWTB06, R6GWTB06, R6GWMW03, R6GWMW04, R6GWMW05
Cyanide-total	7/26	0.005-0.049	0.001	mg/L	R1GWMW14-S2, R1GWMW13, R1GWMW14, R1GWTB01, R1GWTB06, R2GWMW05-S2, R5GWTB03-S2
Nickel-total	26/87	0.0085-0.32	0.0083	mg/L	R1GWMW14-S2, R1GWMW08, R1GWMW14, R1GWMW15, R1GWTB06, R2GWMW03, R2GWMW08, R2GWTB06, R3GWMW05, R3GWMW07, R3GWMW08, R3GWMW09, R3GWTB03, R3GWTB06, R4GWTB06-S2, R4GWMW08, R4GWTB06, R5GWMW03, R5GWMW08, R5WMW10, R5GWTB03, R5GWTB06, R6GWMW08-SC, R6GWMW06, R6GWMW08, R6GWTB06
Phenanthrene	1/46	7	4.6	µg/L	R1GWMW14-S2
Chromium-dissolved	5/J1	0.115-0.645	0.05	mg/L	R1GWMW14, R1GWMW15, R4GWTB06-S2, R5GWTB06, R6GWTB06
Lead-dissolved	2/31	0.0088-0.0166	0.0056	mg/L	R6GWMW08, R6GWMW03



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Analyte	Frequency of Exceedances <sup>1</sup>	Range of Exceed. Conc.	Criteria Value	Units	Sample ID of Criteria Exceedances
Mercury-dissolved	1/30	0.00021	0.000025	mg/L	G6GWMW08-S2-F
Nickel-dissolved	9/31	0.01-0.286	0.0082	mg/L	R1GWMW14, R1GWMW15, R5GWMW08, F5GWMW09, R5GWTB03, R5GWTB06, R6GWMW08-S2-F, R6GWMW08, R6GWTB06
Zinc-dissolved	1/31	0.025	0.0081	mg/L	R6GWMW08-S2-F
Ammonia nitrogen	80/80	0.65-340	0.035	mg/L	All sample locations
<b>Leachate Seep SP01</b>					
Phenanthrene	4/4	8-12	6.3	µg/L	R1LSSP01, R2LSSP01, R5LSSP01, R6LSSP01
Iron-dissolved	4/4	15.3-21.7	1.0	mg/L	R1LSSP01, R2LSSP01, R5LSSP01, R6LSSP01
Lead-dissolved	2/2	0.0067-0.011	0.0025	mg/L	R5LSSP01, R6LSSP01
Cyanide-total	2/4	0.017-0.027	0.0052	mg/L	R5LSSP01, R6LSSP01
Iron-total	4/4	18.2-25.1	1.00	mg/L	R1LSSP01, R2LSSP01, R5LSSP01, R6LSSP01
Lead-total	4/4	0.0456-0.0618	0.0032	mg/L	R1LSSP01, R2LSSP01, R5LSSP01, R6LSSP01
Heptachlor epoxide	1/2	0.013	0.0038	µg/L	R6LSSP01
Aroclor-1016	1/2	1.2	0.014	µg/L	R5LSSP01
Ammonia nitrogen	4/4	140-180	0.045	mg/L	R1LSSP01, R2LSSP01, R5LSSP01, R6LSSP01

<sup>1</sup>Note: The frequency of exceedances are based on the number of hits.



**Table 6-5**  
**Summary of Off-Source Data that Exceed**  
**Ecological Comparison Numbers**

Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
<b>Leachate</b>						
Fluoranthene	2/57	30-51.1	16	N/A	µg/L	R4-LSSP06-S2, R4LSSP06
Phenanthrene	26/58	5-276	4.6	N/A	µg/L	R1-LS-SP04-3/8, R1-LS-SP04-S2, R1LSSP03, R1LSSP04, R1LSSP06, R1LSSP07, R2LSSP03, R3LSSP04, R2LSSP06, R2LSSP07, R3LSSP03, R3LSSP06, R4-LSS-SP06-S2, R4LSSP03, R4LSSP06, R5LSSP03, R5LSSP04, R5LSSP06, R6LSSP03, R6LSSP04, R6LSSP06, R6LSSP07, R6LSSP08, R6LSSP02, R3LSSP00R1, R6LSSP00R1
Aldrin	10/41	0.007-0.036	0.0019	N/A	µg/L	R1LSSP03, R1LSSP09, R1LSSP11, R2LSSP08, R3LSSP06, R3LSSP09, R3LSSP10, R6LSSP08, R6LSSP10, R3LSSP00R1
4,4'-DDT	10/38	0.013-0.049	0.001	N/A	µg/L	R1LSSP09, R3LSSP03, R3LSSP05, R3LSSP06, R6-LSSP08-S2, R6LSSP02, R6LSSP03, R6LSSP06, R6LSSP10, R3LSSP00R1
Endrin	7/39	0.012-0.043	0.0023	N/A	µg/L	R2LSSP08, R3LSSP06, R4LSSP05, R4LSSP06, R5LSSP03, R6LSSP02, R6LSSP08
Heptachlor	6/39	0.0089-0.022	0.0036	N/A	µg/L	R1LSSP11, R2LSSP08, R6LSSP02, R6LSSP04, R6LSSP06, R6LSSP10
Heptachlor epoxide	26/45	0.005-0.064	0.0036	N/A	µg/L	R1LSSP03, R1LSSP04, R1LSSP05, R1LSSP07, R2LSSP06, R3LSSP03, R3LSSP05, R3LSSP06, R3LSSP10, R4LSSP03, R4LSSP05, R4LSSP06, R4LSSP09, R4LSSP10, R6LSSP11, R6LSSP05, R6LSSP06, R6LSSP07, R6LSSP08, R6LSSP09, R6LSSP10, R6LSSP03, R6LSSP04, R3LSSP00R1, R4LSSP00R1, R6LSSP02
Methoxychlor	2/37	0.049-0.071	0.03	N/A	µg/L	R1LSSP09, R5LSSP06
Aroclor-1016	9/39	0.47-1.19	0.03	N/A	µg/L	R5LSSP02, R5LSSP04, R5LSSP06, R5LSSP11, R6LSSP08-S2, R6LSSP02, R6LSSP05, R6LSSP06, R6LSSP10
Aroclor-1232	10/40	1-5.82	0.03	N/A	µg/L	R5-LS-SP09-S2, R5LSSP03, R5LSSP05, R5LSSP08, R5LSSP09, R5LSSP10, R6-LSSP08-S2, R6LSSP07, R5LSSP00R1, R6SSP00R1
Aroclor-1254	1/40	1.31	0.03	N/A	µg/L	R6LSSP08-S2
Chromium-total	19/60	0.0625-0.392	0.05	N/A	mg/L	R1LSSP03, R1LSSP06, R1LSSP11, R2LSSP03, R2LSSP05, R2LSSP06, R2LSSP11, R3LSSP03, R3LSSP05, R3LSSP06, R3LSSP00R1, R4-LS-SP06-S2, R4LSSP03, R4LSSP05, R4LSSP06, R5LSSP03, R5LSSP06, R6LSSP03, R6LSSP06



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Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
Copper-total	25/60	0.0035-0.069	0.0029	N/A	mg/L	R1-LS-SP04-3/8, R1-LS-SP04-S2, R1LSSP08, R1LSSP11, R2-LS-SP10-S2, R2LSSP03, R2LSSP04, R2LSSP05, R2LSSP08, R2LSSP11, R3LSSP03, R3LSSP05, R3LSSP06, R4-LS-SP06-S2, R4LSSP03, R4LSSP05, R5LSSP02, R5LSSP03, R5LSSP04, R5LSSP05, R5LSSP11, R5LSSP06, R6LSSP11, R6LSSP08-S2, R3LSSP00R1
Cyanide-total	13/53	0.011-0.031	0.001	N/A	mg/L	R2LSSP06, R2LSSP08, R3LSSP05, R3LSSP06, R3LSSP09, R4LSSP03, R4LSSP09, R5LSSP02, R5LSSP03, R5LSSP05, R5LSSP06, R5LSSP11, R3LSSP00R1
Lead-total	43/60	0.0111-0.289	0.0085	N/A	mg/L	R1-LS-SP04-3/8, R1-LS-SP04-S2, R1LSSP02, R1LSSP03, R1LSSP04, R1LSSP05, R1LSSP06, R1LSSP07, R1LSSP08, R1LSSP11, R2LSSP03, R2LSSP04, R2LSSP05, R2LSSP06, R2LSSP07, R2LSSP08, R2LSSP11, R3LSSP03, R3LSSP05, R3LSSP06, R4-LS-SP06-S2, R4LSSP06, R5LSSP01, R5LSSP02, R5LSSP03, R5LSSP04, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6LSSP08-S2, R6LSSP01, R6LSSP02, R6LSSP03, R6LSSP04, R6LSSP05, R6LSSP06, R4LSSP03, R4LSSP05, R6LSSP08, R6LSSP11, R3LSSP00R1, R6LSSP00R1, R6LSSP07
Mercury-total	4/52	0.00018-0.00038	0.000025	N/A	mg/L	R1LSSP08, R2LSSP08, R4-LS-SP06-S2, R5LSSP02
Nickel-total	35/60	0.0095-0.1	0.0083	N/A	mg/L	R1-LS-SP04-3/8, R1LSSP02, R1LSSP03, R1LSSP05, R1LSSP06, R1LSSP07, R1LSSP08, R1LSSP11, R2LSSP03, R2LSSP05, R2LSSP06, R2LSSP07, R2LSSP08, R2LSSP11, R3LSSP03, R3LSSP05, R3LSSP06, R4-LS-SP06-S2, R4LSSP03, R6LSSP11, R4LSSP05, R4LSSP06, R5LSSP02, R5LSSP03, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6LSSP02, R6LSSP03, R6LSSP05, R6LSSP06, R6LSSP07, R3-LSSP00R1, R6LSSP00R1
Zinc-total	24/60	0.0868-0.24	0.086	N/A	mg/L	R1LSSP03, R1LSSP08, R1LSSP11, R2LSSP03, R2LSSP05, R2LSSP06, R2LSSP08, R2LSSP11, R3LSSP03, R3LSSP05, R3LSSP06, R4-LS-SP06-S2, R4LSSP03, R4LSSP05, R4LSSP06, R5LSSP02, R5LSSP03, R5LSSP04, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6LSSP11, R3LSSP00R1
Dieldrin	6/39	0.006-0.02	0.0019	N/A	µg/L	R4LSSP06, R6LSSP03, R6LSSP04, R6LSSP06, R6LSSP08, R6LSSP11
Endosulfan I	3/39	0.0089-0.016	0.0087	N/A	µg/L	R4LSSP03, R4LSSP05, R6LSSP09
Chromium-dissolved	7/26	0.0688-0.32	0.05	N/A	mg/L	R4-LSSP06-S2-F, R4LSSP03, R4LSSP05, R4LSSP06, R5LSSP03, R5LSSP06, R6LSSP06



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Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
Copper-dissolved	6/23	0.016-0.0509	0.0024	N/A	mg/L	R4-LS-SP06-S2-F, R4LSSP03, R4LSSP05, R5LSSP05, R5LSSP06, R5LSSP11
Lead-dissolved	6/26	0.0057-0.0353	0.0056	N/A	mg/L	R4-LS-SP06-S2-F, R4LSSP06, R5LSSP05, R5LSSP06, R6LSSP06, R6LSSP11
Nickel-dissolved	14/19	0.0086-0.11	0.0082	N/A	mg/L	R4LSSP06-S2-F, R4LSSP05, R4LSSP06, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6LSSP02, R6LSSP03, R6LSSP05, R6LSSP06, R6LSSP07, R6LSSP08, R6LSSP11
Zinc-dissolved	9/26	0.012-0.147	0.0081	N/A	mg/L	R4LSSP03, R4LSSP06, R5-LSSP09-S2-F, R5LSSP02, R5LSSP05, R5LSSP06, R5LSSP08, R5LSSP11, R6-LS-SP08-S2-F
Ammonia nitrogen	46/46	27-180	0.035	N/A	mg/L	All sample locations
gamma-chlordane	1/36	0.006	0.004	N/A	µg/L	R6LSSP11
<b>Surface Soil</b>						
2-Methylnaphthalene	13/106	72-68000	2.6	N/A	µg/kg	R1-SB-SB01C1-S2, R1-SB-SB04A1-S2, R1-SB-SB06A1-S2, R1-SB-SB08A1-S2, R1-SB-SB09A1S2, R1SBSB02A1, R1SBSB03A1, R1SBSB04A1, R1SBSB06A1, R1SBSB08A1, R1SBSB08B1, R1SBSB08C1, R1SBSB09A1
Acenaphthene	5/106	1300-41200	1100	N/A	µg/kg	R1-SB-SB06A1-S2, R1-SB-SB09A1-S2, R1SBSB02A1, R1SBSB06A1, R1SBSB09A1
bis(2-Ethylhexyl)phthalate	4/106	7600-14300	6500	N/A	µg/kg	R1-SB-SB06A1-S2, R1-SB-SB08A1-S2, R1SBSB05H1, R1SBSB08G1
Fluorene	6/106	1100-44200	1100	N/A	µg/kg	R1-SB-SB06A1-S2, R1-SB-SB09A1-S2, R1SBSB02A1, R1SBSB06A1, R1SBSB09A1, R1SBSB09D1
Naphthalene	4/106	7300-64700	3900	N/A	µg/kg	R1-SB-SB06A1-S2, R1-SB-SB09A1-S2, R1SBSB06A1, R1SBSB09A1
Phenanthrene	2/106	84000-105000	20000	N/A	µg/kg	R1-SB-SB06A1-S2, R1SBSB06A1
Aroclor-1242	4/106	470-1900	170	N/A	µg/kg	R1SBSB05A1, R1SBSB06A1, R1SBSB09A1, R1SBSB09D1
Aroclor-1260	3/106	340-1100	170	N/A	µg/kg	R1-SB-SB08A1-S2, R1SBSB06A1, R1SBSB08A1
4,4'-DDT	1/106	110	6.5	N/A	µg/kg	R1-SB-SB08A1-S2



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Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
Aluminum	106/106	2640-33800	50	32,581	mg/kg	All sample locations exceed criteria value. However, all locations except one were below background.
Arsenic	11/93	30.6-47.3	30	7.30	mg/kg	R1SBSB01E1, R1SBSB01G1, R1SBSB02I1, R1SBSB06B1, R1SBSB06C1, R1SBSB06D1, R1SBSB06E1, R1SBSB06F1, R1SBSB06H1, R1SBSB06I1, R1SBSB07E1
Barium	3/106	788-1650	500	N/A	mg/kg	R1-SB-SB09A1-S2, R1SBSB09A1, R1SBSB09D1
Chromium	2/106	151-174	100	48.15	mg/kg	R1-SB-SB06A1-S2, R1SBSB06A1
Cobalt	1/106	97.7	50	N/A	mg/kg	R1SBSB02I1
Copper	2/106	129-135	100	36.36	mg/kg	R1SBSB02C1, R1SBSB02I1
Lead	7/106	223-335	200	16.83	mg/kg	R1-SB-SB08A1-S2, R1SBSB02A1, R1SBSB04D1, R1SBSB05A1, R1SBSB05G1, R1SBSB08A1, R1SBSB08F1
Manganese	10/106	1230-3620	1200	1146	mg/kg	R1SBSB02E1, R1SBSB02I1, R1SBSB05H1, R1SBSB06C1, R1SBSB06G1, R1SBSB06H1, R1SBSB07B1, R1SBSB07D1, R1SBSB07E1, R1SBSB07I1
Vanadium	45/106	60.3-78.9	60	N/A	mg/kg	R1-SB-SB01C1-S2, R1-SB-SB02D1-S2, R1-SB-SB06A1-S2, R1-SB-SB07H1-S2, R1-SB17-S2, R1SBSB01C1, R1SBSB01D1, R1SBSB01E1, R1SBSB01F1, R1SBSB01G1, R1SBSB01H1, R1SBSB02B1, R1SBSB02C1, R1SBSB02D1, R1SBSB02G1, R1SBSB02H1, R1SBSB02I1, R1SBSB03H1, R1SBSB04C1, R1SBSB06A1, R1SBSB06B1, R1SBSB06C1, R1SBSB06D1, R1SBSB06E1, R1SBSB06F1, R1SBSB06G1, R1SBSB06H1, R1SBSB06I1, R1SBSB07B1, R1SBSB07C1, R1SBSB07D1, R1SBSB07E1, R1SBSB07F1, R1SBSB07I1, R1SBSB08E1, R1SBSB09E1, R1SBSB09F1, R1SBSB09G1, R1SBSB09I1, R1SBSB1101, R1SBSB1301, R1SBSB1401, R1SBSB1601, R1SBSB2001, R1SBSB2201



Table 6-5 - page 5

Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
Zinc	84/106	67.5-414	67	85.06	mg/kg	R1-SB-SB01C1-S2, R1-SB-SB02D1-S2, R1-SB-SB03B1-S2, R1-SB-SB07H1-S2, R1-SB-SB08A1-S2, R1-SB-SB09A1-S2, R1-SB-SB04A1-S2, R1-SB-SB06A1-S2, R1-SB-SB17-S2, R1-SB-SB01A1, R1-SB-SB01B1, R1-SB-SB01C1, R1-SB-SB01D1, R1-SB-SB01E1, R1-SB-SB01F1, R1-SB-SB01G1, R1-SB-SB01H1, R1-SB-SB01I1, R1-SB-SB02A1, R1-SB-SB02B1, R1-SB-SB02C1, R1-SB-SB02D1, R1-SB-SB02E1, R1-SB-SB02F1, R1-SB-SB02G1, R1-SB-SB02H1, R1-SB-SB02I1, R1-SB-SB03C1, R1-SB-SB03D1, R1-SB-SB03E1, R1-SB-SB03F1, R1-SB-SB03G1, R1-SB-SB03H1, R1-SB-SB04B1, R1-SB-SB04C1, R1-SB-SB04D1, R1-SB-SB04E1, R1-SB-SB04F1, R1-SB-SB04H1, R1-SB-SB05A1, R1-SB-SB05B1, R1-SB-SB05D1, R1-SB-SB06A1, R1-SB-SB06B1, R1-SB-SB06C1, R1-SB-SB06D1, R1-SB-SB06E1, R1-SB-SB06F1, R1-SB-SB06G1, R1-SB-SB06H1, R1-SB-SB06I1, R1-SB-SB07B1, R1-SB-SB07C1, R1-SB-SB07D1, R1-SB-SB07E1, R1-SB-SB07F1, R1-SB-SB07G1, R1-SB-SB07H1, R1-SB-SB07I1, R1-SB-SB08A1, R1-SB-SB08C1, R1-SB-SB08E1, R1-SB-SB08F1, R1-SB-SB09A1, R1-SB-SB09B1, R1-SB-SB09C1, R1-SB-SB09E1, R1-SB-SB09F1, R1-SB-SB09G1, R1-SB-SB09I1, R1-SB-SB1101, R1-SB-SB1201, R1-SB-SB1301, R1-SB-SB1401, R1-SB-SB1501, R1-SB-SB1601, R1-SB-SB1701, R1-SB-SB1901, R1-SB-SB2001, R1-SB-SB2101, R1-SB-SB2201, R1-SB-SB2301, R1-SB-SB2401, R1-SB-SB2501
<b>Subsurface soil</b>						
2-Methylnaphthalene	13/20	34-72000	2.6	N/A	µg/kg	R1-SB-SB04A2-S2, R1-SB-SB06A2-S2, R1-SB-SB03A2, R1-SB-SB03A3, R1-SB-SB03A4, R1-SB-SB04A2, R1-SB-SB04A3, R1-SB-SB06A2, R1-SB-SB06A3, R1-SB-SB06A4, R1-SB-SB03A2, R1-SB-SB09A3, R1-SB-SB09A4
Acenaphthylene	1/20	10000	1100	N/A	µg/kg	R1-SB-SB06A2-S2
Acenaphthene	7/20	1100-42900	1100	N/A	µg/kg	R1-SB-SB06A2-S2, R1-SB-SB03A2, R1-SB-SB03A3, R1-SB-SB03A4, R1-SB-SB06A2, R1-SB-SB06A3, R1-SB-SB06A4
bis(2-Ethylhexyl)phthalate	1/20	10100	6500	N/A	µg/kg	R1-SB-SB06A2-S2
Fluorene	6/20	1200-46500	1100	N/A	µg/kg	R1-SB-SB06A2-S2, R1-SB-SB03A3, R1-SB-SB03A4, R1-SB-SB06A2, R1-SB-SB06A3, R1-SB-SB06A4
Naphthalene	6/20	4000-85300	3900	N/A	µg/kg	R1-SB-SB06A2-S2, R1-SB-SB03A3, R1-SB-SB03A4, R1-SB-SB06A2, R1-SB-SB06A3, R1-SB-SB06A4



Table 6-5 page 6

Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
Phenanthrene	4/20	41000-120000	20000	N/A	µg/kg	R1-SB-SB06A2-S2, R1SBSB06A2, R1SBSB06A3, R1SBSB06A4
Aroclor-1242	8/19	180-1100	170	N/A	µg/kg	R1SBSB05A2, R1SBSB05A3, R1SBSB05A4, R1SBSB06A2, R1SBSB06A3, R1SBSB06A4, R1SBSB09A3, R1SBSB09A4
Aroclor-1260	1/20	200	170	N/A	µg/kg	R1SBSB06A4
Aluminum	20/20	11900-23100	50	32,581	mg/kg	All sample locations exceeded criteria value. However, all locations were below background.
Arsenic	3/17	31-32.4	30	7.30	mg/kg	R1SBSB06A2, R1SBSB06A3, R1SBSB06A4
Chromium	3/20	109-150	100	48.15	mg/kg	R1-SB-SB06A2-S2, R1SBSB06A2, SBSB06A3
Vanadium	5/20	61.7-78.7	60	N/A	mg/kg	R1-SB-SB04A2-S2, R1-SB-SB06A2-S2, R1SBSB05A4, R1SBSB06A2, R1SBSB06A4
Zinc	13/20	68.3-150	67	85.06	mg/kg	R1-SB-SB04A2-S2, R1-SB-SB06A2-S2, R1SBSB04A2, R1SBSB05A2, R1SBSB05A3, R1SBSB05A4, R1SBSB06A2, R1SBSB06A3, R1SBSB06A4, R1SBSB07A4, R1SBSB09A2, R1SBSB09A3, R1SBSB09A4



Table 6-5 - page 7

Analyte	Frequency of Exceedances	Range of Exceed. Conc.	Criteria Value	Background Conc.	Units	Sample ID of Criteria Exceedances
<b>Surface Water</b>						
Lead	1/20	0.011	0.0085	N/A	mg/kg	R1SWSG37
<b>Surface Sediment</b>						
4-Methylphenol	6/52	730-3000	670	N/A	µg/kg	R1-SD-SG10-S2, R1-SD-SG32-S2, R2SDSG05, R1SDSG11, R1SDSG20, R1SDSG21
Fluoranthene	1/52	4700	2500	N/A	µg/kg	R1SDSG13
Phenol	10/52	440-1400	420	N/A	µg/kg	R1SDSG01, R1SDSG06, R1SDSG09, R1SDSG10, R1SDSG11, R1SDSG14, R1SDSG15, R1SDSG16, R1SDSG17, R1SDSG18
Arsenic	1/52	94.4	57	N/A	mg/kg	R1SDSG19
Chromium	1/52	300	260	N/A	mg/kg	R1SD-SG08-S2
Nickel	1/52	381	140	N/A	mg/kg	R1-SD-SG08-S2
<b>Subsurface Sediment</b>						
Fluoranthene	2/20	3300-8100	2500	N/A	µg/kg	R1SDSG2802, R1SDSG2804
Pyrene	1/20	4100	3300	N/A	µg/kg	R1SDSG2802
Arsenic	1/20	60.9	57	N/A	mg/kg	R1SDSG1902



Table 9-1

Cost Estimate Comparisons <sup>1</sup> (in millions of dollars)		
Respondents Cost Estimate <sup>2</sup>	EPA Cost Estimate	Alternative
-----	\$1.0	1 - No Action
-----	\$5.9	2 - Active Seep Interception
\$13.3	\$21.3	2b - Leachate Collection with Discharge to Treatment Berm
\$11.8	\$20.8	2b(ii) - Leachate Collection with Discharge to POTW
-----	\$22.0	3 - Leachate Seep and Ground Water Collection and Treatment
-----	\$22.1	4a - Soil Cover with Passive Drainage
\$18.6	\$21.3	4b - Geosynthetic Cover with Active Drainage
\$22.4	\$25.1	4c - Geosynthetic Cover with Passive Drainage
\$27.1	\$29.8	4d - Composite Cover with Passive Drainage
\$25.6	\$28.3	5 - Geosynthetic Cover with Leachate Seep Control
\$36.0	\$38.7	6 - Geosynthetic Cover with Leachate Seep and Zone 2 Ground Water Collection/Treatment

<sup>1</sup> Alternatives that meet the NCP threshold criteria are in shown in bold type. Cost estimates include capital costs and operations and maintenance (O&M) costs, calculated using a 5% discount rate over 30 years.

<sup>2</sup> If different than EPA's cost estimate.



**Table 10-1**  
**Cost Estimate for Alternative 4c**  
**Geosynthetic Cover with Passive Drainage**

Item	Qty	Units	Unit Cost	Cost <sup>a</sup>	Notes
<b>Capital Costs</b>					
Deed modification		LS		\$5,000	
Monitoring plan		LS		\$50,000	
Well abandonment		LS		\$30,000	
Transportation improvement		LS		\$250,000	
Clearing and grubbing	147	acre	\$3,500	\$514,000	
<u>Passive Grading Plan:</u>					
Regrade onsite soil	300,000	cy	\$2.00	\$600,000	
Re-grade waste	140,000	cy	\$3.00	\$420,000	
Import soil	400,000	cy	\$10.00	\$4,000,000	
<u>Surface Water Controls:</u>					
Perimeter road/drainage ditch	12,000	ft	\$25.00	\$300,000	
Perimeter sumps	20	sump	\$6,000	\$120,000	
Wetlands Mitigation	1.1	acre	\$10,000	\$11,500	2,500 ft <sup>2</sup> per outfall
<u>Cover:</u>					
Gas system	11,000	ft	\$5.00	\$55,000	
Establish vegetation	147	acre	\$1,500	\$220,200	
Vegetative layer (import soil)	237,000	cy	\$12.00	\$2,844,000	1 ft thick
Edgedrain	130,000	ft	\$5.00	\$650,000	
Geotextile	6,400,000	sf	\$0.15	\$960,000	
Flexible membrane liner (FML)	6,400,000	sf	\$0.40	\$2,560,000	
Subtotal Capital Costs				\$13,589,700	
Contractor overhead and profit			10%	\$1,359,000	
Engineering			8%	\$1,087,000	
Construction surveillance			3%	\$408,000	
Contingency			25%	\$3,397,000	
Total Capital Costs				\$19,841,000	
<b>Operation and Maintenance (O&amp;M) Costs</b>					
Cover maintenance		yr		\$72,000	
Surface water controls maintenance		yr		\$12,000	
Annual groundwater monitoring costs		yr		\$50,000	
Subtotal O&M Costs				\$134,000	
Contingency			25%	\$34,000	
Annual O&M Costs				\$168,000	
Net Present Value of O&M Costs	30	yr	\$168,000	\$3,763,000	Net discount rate = 2%
Net Present Value of O&M Costs	30	yr	\$168,000	\$2,583,000	Net discount rate = 5%
Total Alternative Cost (Net Present Value) <sup>b</sup>				\$23,604,000	Net discount rate = 2%
Total Alternative Cost (Net Present Value) <sup>b</sup>				\$22,424,000	Net discount rate = 5%

<sup>a</sup> Costs are for mid-1994. Some costs are rounded.

<sup>b</sup> The sum of capital costs and the net present value of operations and maintenance costs.



**Table 11-1—Chemical-Specific ARARs for Surface Water at the Tulalip Landfill Site<sup>1</sup>**

Analyte	Concentration (mg/L)	Criteria	Reference <sup>2,3,4</sup>
<b>VOCs</b>			
1,1-Dichloroethane	0.0032	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Benzene	0.071	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Chlorobenzene	0.129	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Chloroform	0.47	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Chloromethane	6.4	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Ethylbenzene	0.43	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Methylene Chloride	1.6	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Toluene	5	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Trichloroethene	0.081	HH - Federal Fish Consumption	40 CFR Part 131, 1992
<b>BNAs</b>			
1,2-Dichlorobenzene	1.97	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
1,3-Dichlorobenzene	1.97	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
1,4-Dichlorobenzene	1.97	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
2-Methylnaphthalene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
2,4-Dichlorophenol	0.79	HH - Federal Fish Consumption	40 CFR Part 131, 1992
3,3'-Dichlorobenzidine	0.000077	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Acenaphthylene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Acenaphthene	0.71	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Anthracene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Benzo(a)anthracene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Benzo(a)pyrene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Benzo(b)fluoranthene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Benzo(g,h,i)perylene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992
Benzo(k)fluoranthene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
bis(2-Chloroethyl)ether	0.0014	HH - Federal Fish Consumption	40 CFR Part 131, 1992
bis(2-Ethylhexyl)phthalate	0.0059	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Chrysene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Di-n-butylphthalate	12	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Dibenz(a,h)anthracene	0.000031	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Diethylphthalate	120	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Fluoranthene	0.016	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Fluorene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
n-Nitrosodiphenylamine	0.016	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Naphthalene	2.35	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Pentachlorophenol	0.0079	Eco - WA State Marine chronic	WAC 173-201A
Phenanthrene	0.0046	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Phenol	5.8	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Pyrene	0.3	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
<b>PCBs/Pesticides</b>			
4,4'-DDD	0.00000084	HH - Federal Fish Consumption	40 CFR Part 131, 1992
4,4'-DDE	0.00000059	HH - Federal Fish Consumption	40 CFR Part 131, 1992
4,4'-DDT	0.00000059	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aldrin	0.00000014	HH - Federal Fish Consumption	40 CFR Part 131, 1992
alpha-BHC	0.000013	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1016	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1232	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1242	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1248	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1254	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Aroclor-1260	0.000000045	HH - Federal Fish Consumption	40 CFR Part 131, 1992



Table 11-1--Page 2'

Analyte	Concentration (mg/L)	Criteria	Reference <sup>2,3,4</sup>
beta-BHC	0.000046	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Chlordane	0.00000059	HH - Federal Fish Consumption	40 CFR Part 131, 1992
delta-BHC	0.00034	Eco - Marine AWQC acute	40 CFR Part 131, 1992; 1995
Dieldrin	0.00000014	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Endosulfan I	0.0000087	Eco - WA State Marine chronic	WAC 173-201A
Endosulfan II	0.0000087	Eco - WA State Marine chronic	WAC 173-201A
Endosulfan sulfate	0.002	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Endrin	0.0000023	Eco - WA State Marine chronic	WAC 173-201A
Endrin aldehyde	0.00081	HH - Federal Fish Consumption	40 CFR Part 131, 1992
gamma-BHC (Lindane)	0.000063	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Heptachlor	0.00000021	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Heptachlor epoxide	0.00000011	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Methoxychlor	0.00003	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
<b>INORGANICS<sup>5</sup></b>			
Antimony	0.5	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Arsenic	0.00014	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Cadmium	0.0093	Eco - WA State Marine chronic	WAC 173-201A
Chromium (VI)	0.05	Eco - WA State Marine chronic	WAC 173-201A
Copper	2.40E-03/2.90E-03	Eco - Mar. AWQC chronic/WA State Mar. acute	40 CFR Part 131, 1995/WAC 173-201A
Cyanide	0.001	Eco - WA State Marine acute	WAC 173-201A
Lead	0.0056/0.0085	Eco - Marine AWQC chronic	40 CFR Part 131, 1992; 1995
Mercury	0.000025	Eco - WA State Marine chronic	WAC 173-201A
Nickel	0.0079/8.30E-03	Eco - WA State Marine chronic	WAC 173-201A
Selenium	0.071	Eco - WA State Marine chronic	WAC 173-201A
Silver	0.0023	Eco - WA State Marine acute	WAC 173-201A
Thallium	0.0065	HH - Federal Fish Consumption	40 CFR Part 131, 1992
Zinc	0.076/0.086	Eco - WA State Marine chronic	WAC 173-201A
<b>CONVENTIONALS</b>			
Ammonia <sup>6</sup>	0.035	Eco-WA State Marine chronic	WAC 173-201A

<sup>1</sup> During detailed design, EPA may select a subset of the surface water ARARs for the purpose of monitoring the interim remedy. EPA plans to adjust

compliance levels for these surface water ARARS, if appropriate, to account for practical quantitation limits (PQLs) and for surface water background concentrations.

<sup>2</sup> Values taken from EPA Water Quality Standards 40 CFR Part 131, December, 1992 for the protection of human health from ingestion of seafood. The National Toxics Rule allows these Federal criteria to be used as state standards.

<sup>3</sup> Values taken from EPA Water Quality Standards 40 CFR Part 131, December, 1992 and EPA Interim Final Standards, 1995 for the protection of aquatic organisms.

<sup>4</sup> Values taken from the Washington State WAC 173-201A for the protection of aquatic life.

<sup>5</sup> AWQC criteria for inorganics are the same for dissolved or total metals except where a slash indicated otherwise. In this case the first value is the dissolved criteria value.

Translation from total to dissolved metals based on WAC 173-201A calculations.

<sup>6</sup> Assume conversion factor of 1.2 from ammonia-N to total ammonia and 5% of total ammonia is un-ionized ammonia.

All AWQC calculations are based on a pH of 7.8 and a hardness of 100 ppm of CaCO<sub>3</sub>, which is reasonable because these are within ranges that have been measured at the site.



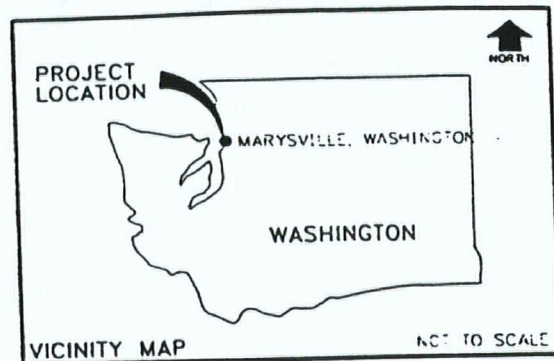
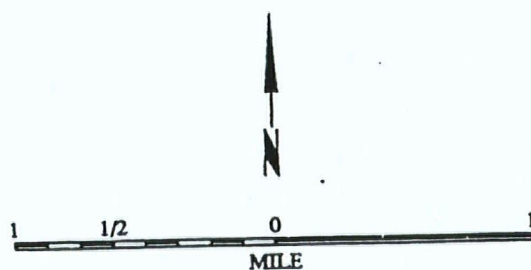
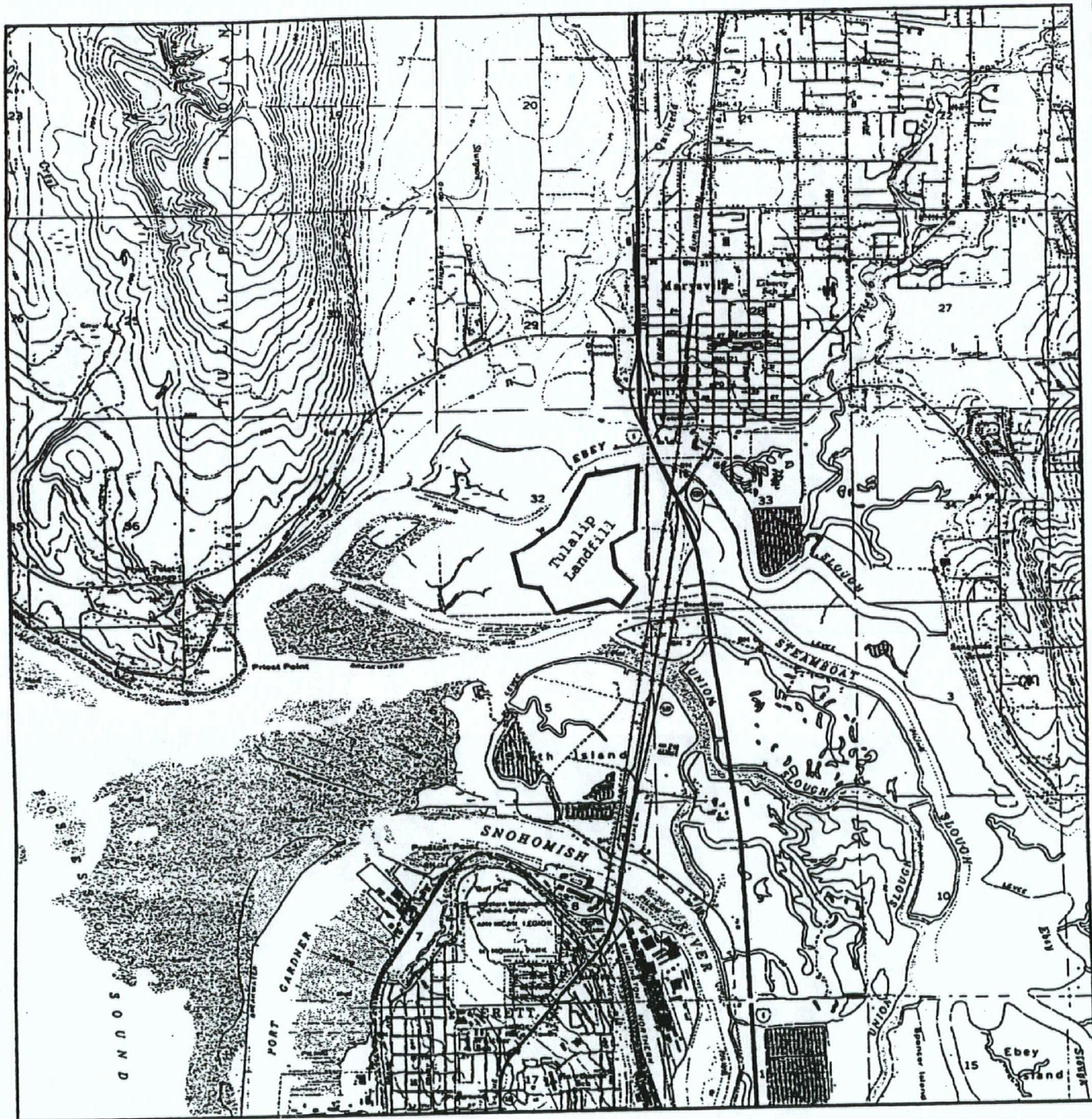
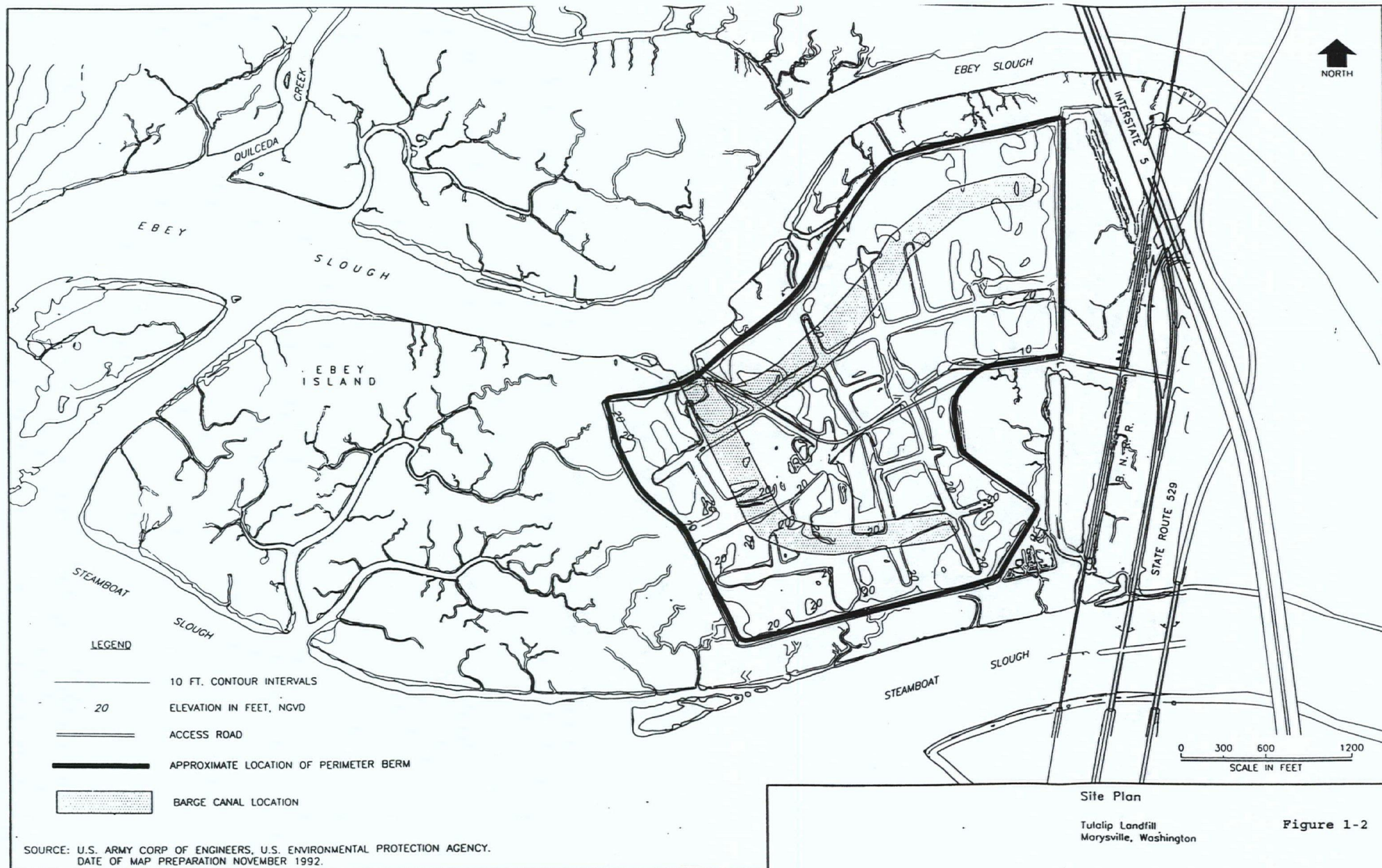


Figure 1-1 SITE LOCATION MAP







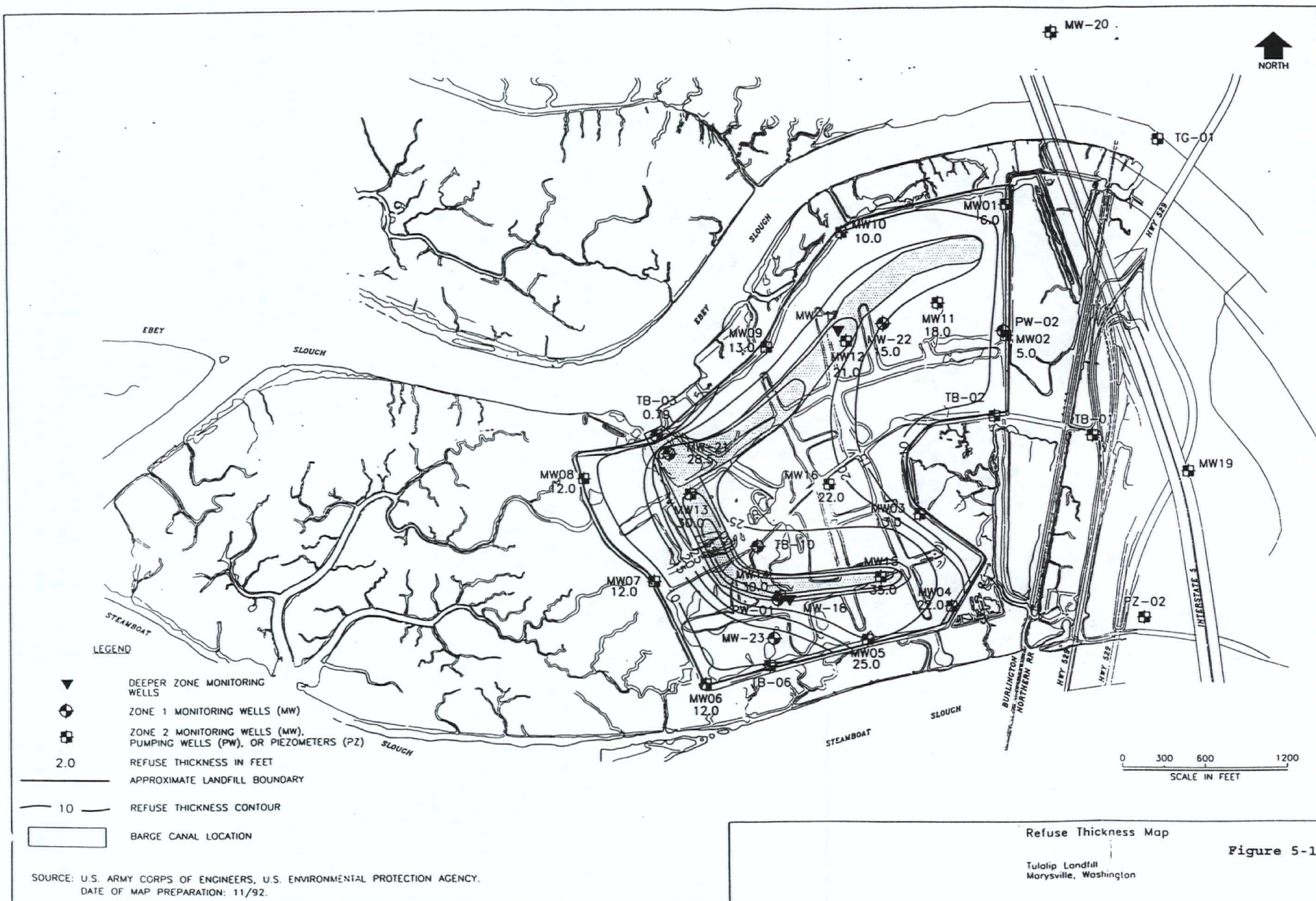


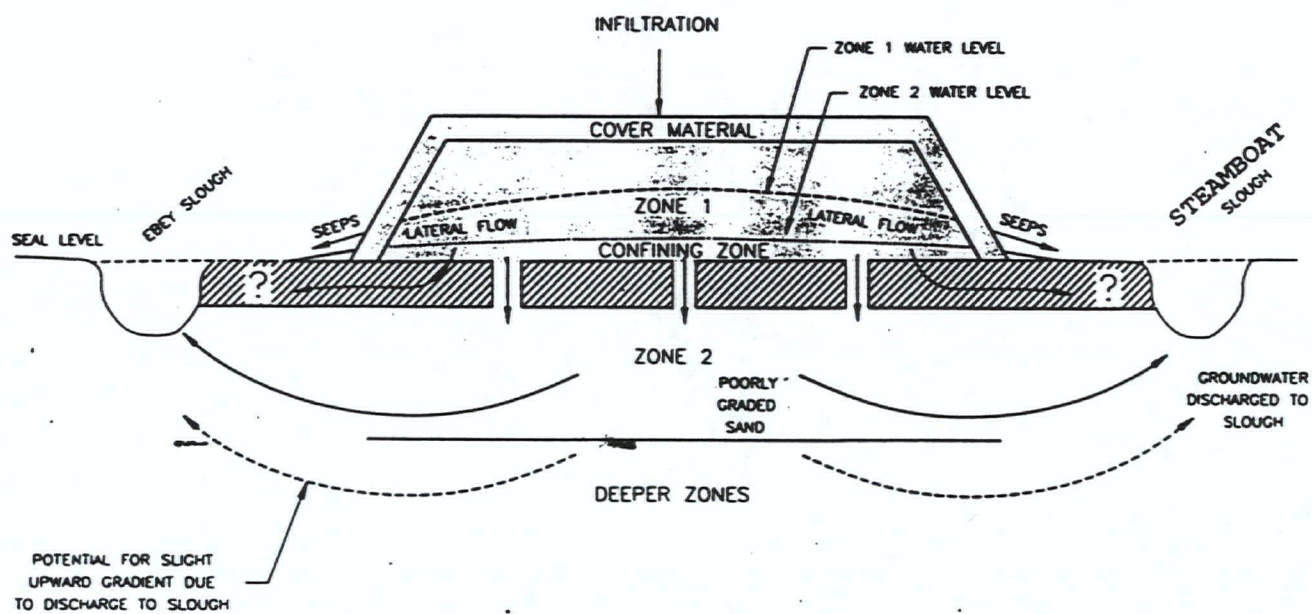
Figure 5-1

SOURCE: U.S. ARMY CORPS OF ENGINEERS, U.S. ENVIRONMENTAL PROTECTION AGENCY.  
DATE OF MAP PREPARATION: 11/92.







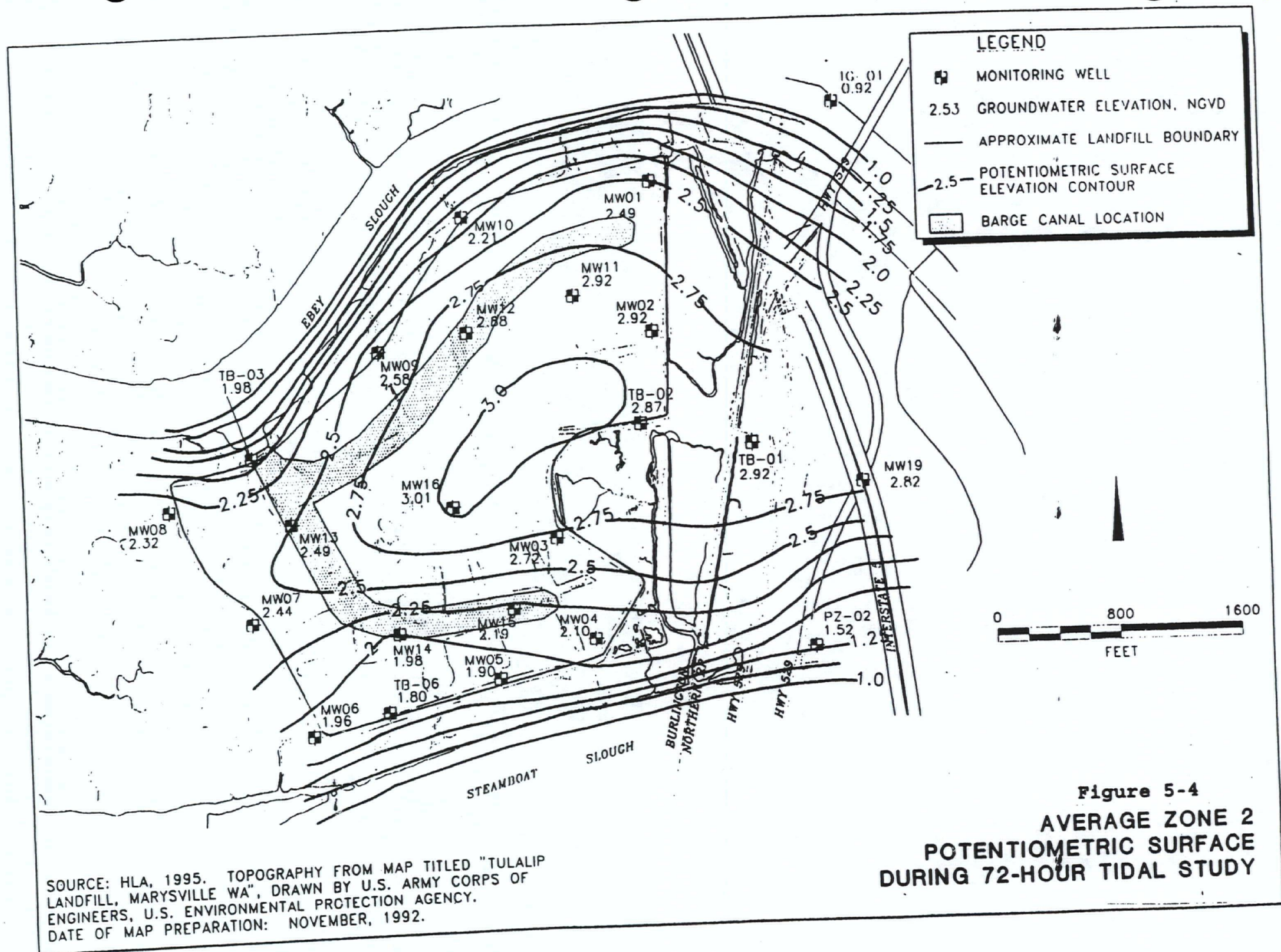


Conceptual Hydrologic Model  
For Tulalip Landfill

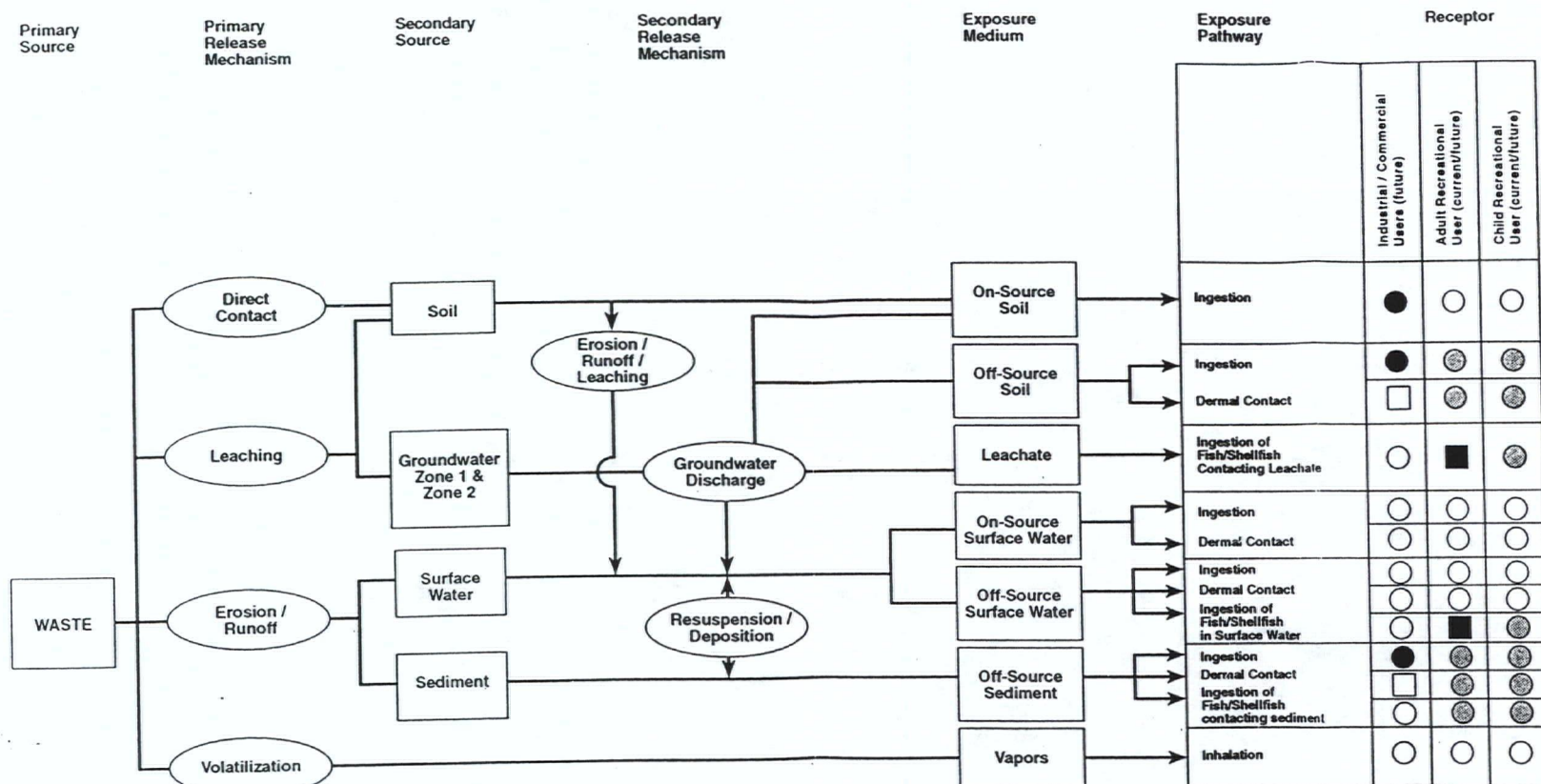
Tulalip Landfill  
Marysville, Washington

Figure 5-3









#### EXPLANATION

- Not considered a viable pathway
- Pathway evaluated in streamlined baseline Risk Assessment
- Pathway to be evaluated in off-source comprehensive baseline risk assessment
- Pathway evaluated in streamlined Risk Assessment and in upcoming off-source comprehensive baseline risk assessment
- Pathway not evaluated due to lack of available comparison numbers

#### Tulalip Landfill Human Health Conceptual Site Model

Figure 5-5



Primary Source

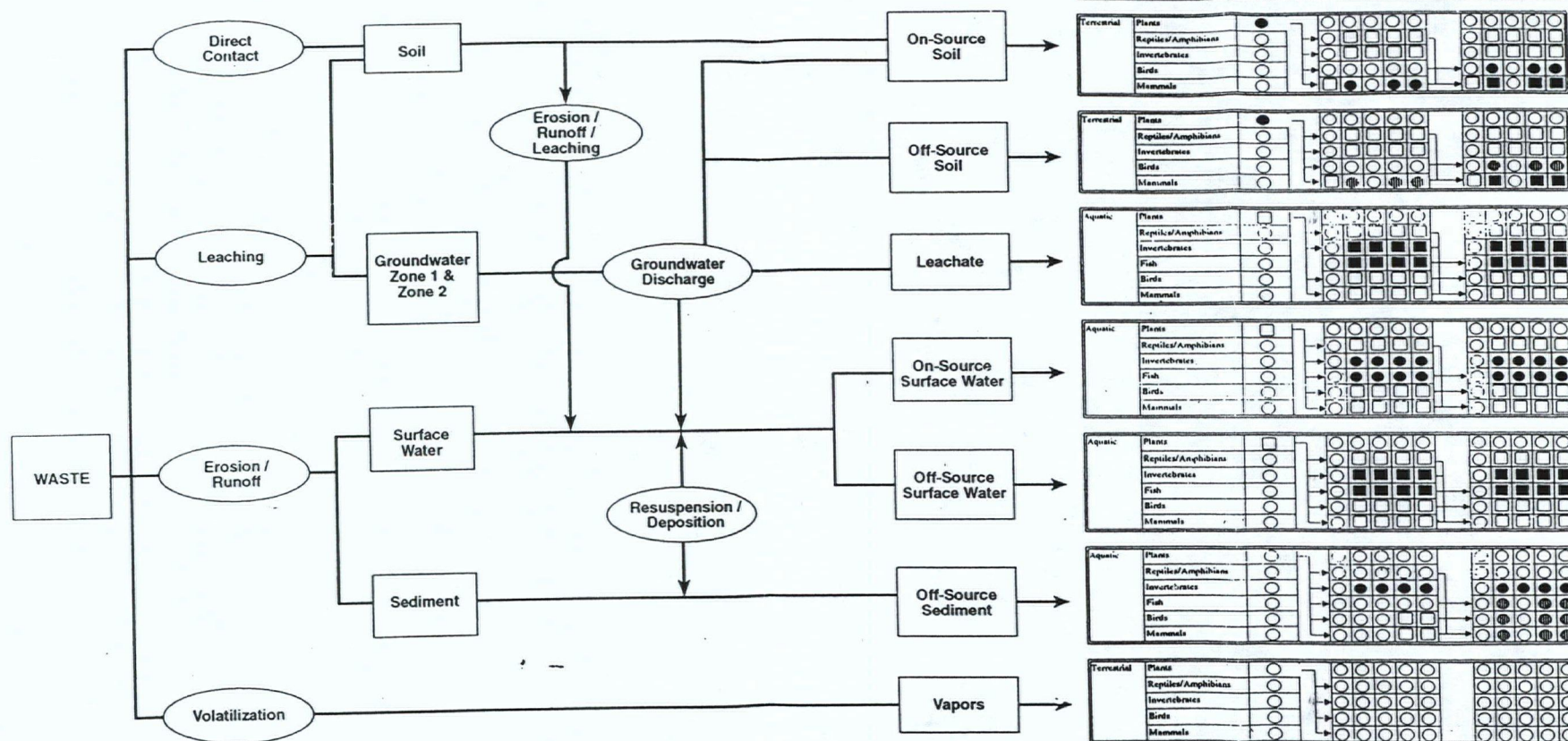
Primary Release Mechanism

Secondary Source

Secondary Release Mechanism

Exposure Medium

Habitat	Potential Receptors	Trophic Levels									
		Primary Producer	Herbivore/Grazing					Carnivore			Exposure Route
			Plant Uptake/Soil	Foodchain Transfer	Inhalation	Aquatic Food	Ingestion Water	Ingestion Soil/Sed	Dermal Contact	Foodchain Transfer	



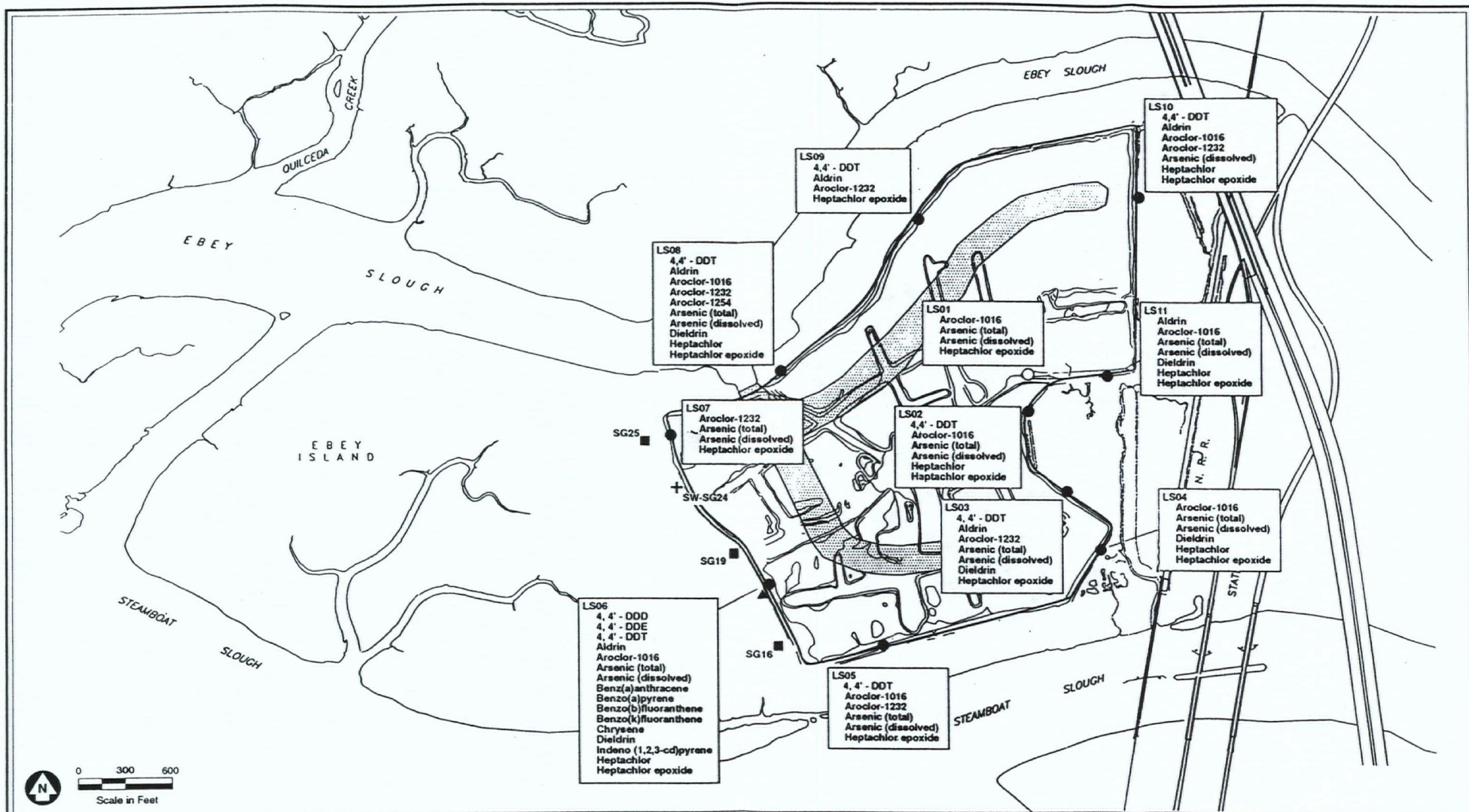
# EXPLANATION

- Not considered a viable pathway
- Pathway evaluated in streamlined baseline Risk Assessment
- ◐ Pathway to be evaluated in off-source comprehensive baseline risk assessment
- Pathway evaluated in streamlined Risk Assessment and in upcoming off-source comprehensive baseline risk assessment
- Pathway not evaluated due to lack of available comparison numbers

Tulalip Landfill  
Ecological Conceptual Site Model

Figure 5-6





#### EXPLANATION

- Off-Source Leachate Seep Sample Location with Exceedance Contaminant Listed
- Off-Source Sediment Location with Arsenic Exceedance
- ▲ Off-Source Soil Location with Arsenic Exceedance
- ⊕ Off-Source Surface Water Location with Arsenic Exceedance

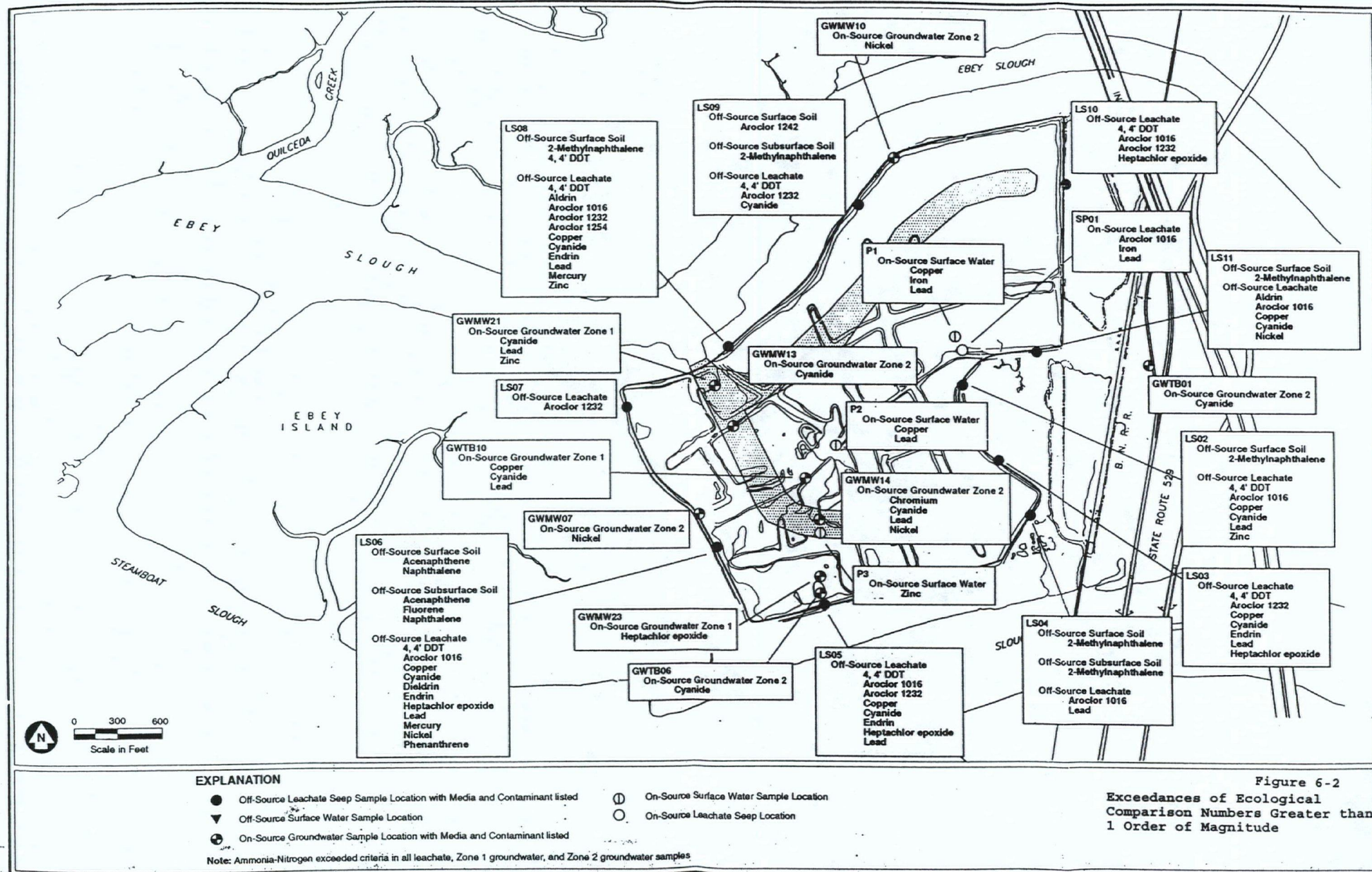
- On-Source Leachate Seep Location

NOTE: This figure has been updated following preparation of the final streamlined Risk Assessment (see footnote 1 in both Tables 6-1 and 6-2). Ground water exceedances are not shown.

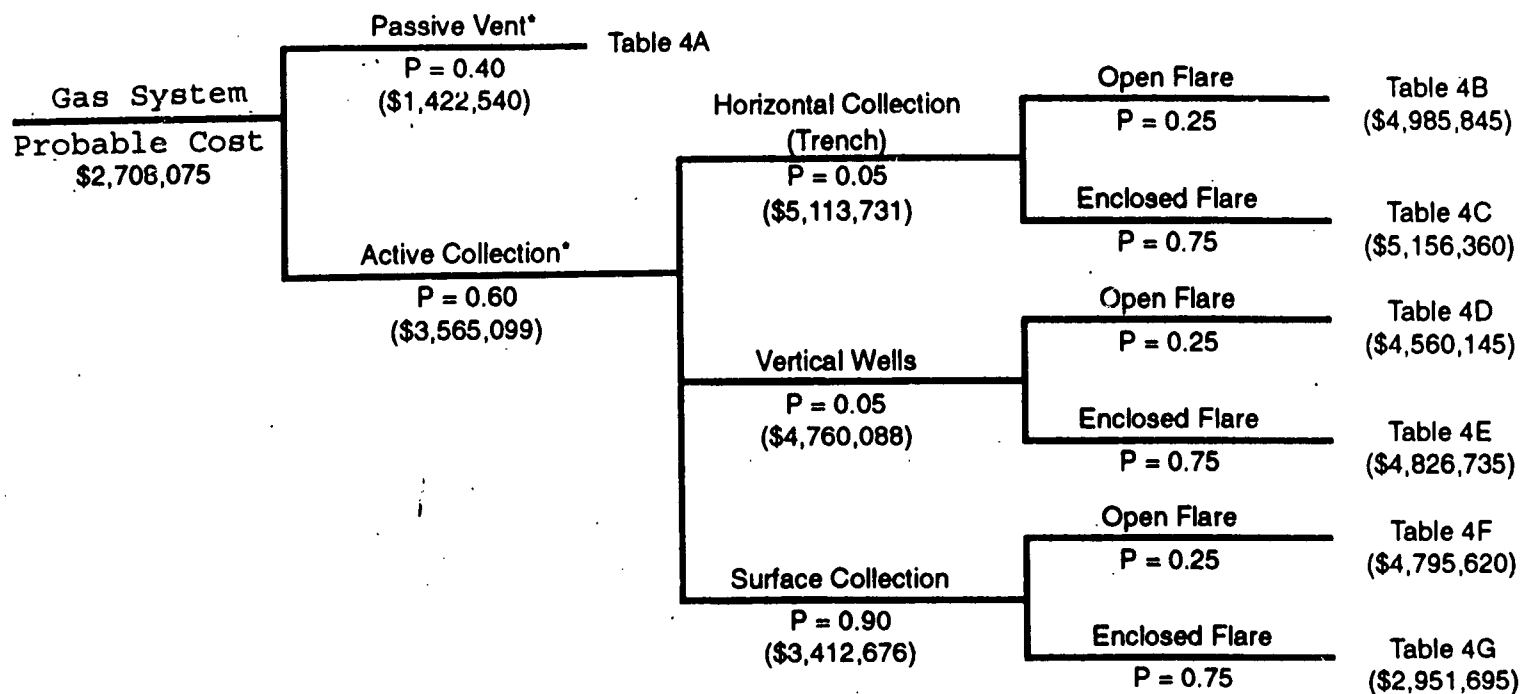
Tulip Landfill  
Exceedances of Human Health Comparison Numbers  
Greater than 1 Order of Magnitude

FIGURE  
**6-1**









\* Probability Based on Nuisance Odor

Note: Dollar amounts shown have not been multiplied by the corresponding probability.

## Decision Tree and Most Probable Cost for Landfill Gas System

Figure 10-1

Note: For more information regarding this Figure, see interim ROD Appendix B.



# **Interim Remedial Action ROD**

## **APPENDIX A**



**Appendix A:  
Summary of Comparison of  
Remedial Alternatives 2b, 2b(ii), 3, 4a, and 4b in  
Relation to the NCP Balancing Criteria**

The following alternatives do not meet the two National Contingency Plan (NCP) "threshold criteria":<sup>1</sup>

- 2b Leachate Collection with Discharge to Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW<sup>2</sup>
- 3 Leachate Seep and Ground Water Collection and Treatment
- 4a Soil Cover with Passive Drainage
- 4b Geosynthetic Cover with Active Drainage

Because these alternatives do not meet the two threshold criteria, they were not carried further through the comparative analysis in the ROD. However, this appendix provides a comparative analysis of these alternatives to the NCP criteria 3 through 7:

3. Long-term effectiveness and permanence considers the ability of an alternative to maintain protection of human health and the environment over time, and the reliability of such protection.

Alternative 4a - Soil Cover with Passive Drainage, would be relatively permanent in the long term. But, because it would not meet many of the RAOs, including eliminating Zone 1 leachate discharges through the berm, and minimizing contaminated Zone 2 ground water to the sloughs, it is not considered to be an effective alternative in the long term.

The Geosynthetic Cover with Active Drainage (4b) partially meets this criterion. Because this alternative would rely heavily on an external power source over the long term, EPA considers it to be less permanent because of the increased potential for system failure, and because the future cost of operating the system would increase if future energy costs rise.

Because there is considerable uncertainty regarding the potential effectiveness of the following alternatives, EPA considers them to be ineffective in the long term:

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<sup>1</sup> The two threshold NCP Criteria are: 1. Overall Protection of Human Health and the Environment; and 2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). Section 9.0 of the ROD explains why these alternatives do not meet the threshold criteria.

<sup>2</sup> Publicly Owned Treatment Works



- 2b Leachate Collection with Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW
- 3 Seep and Zone 2 Ground Water Controls

EPA has serious concerns about the long-term effectiveness of the Leachate Collection with Treatment Berm alternative (2b) as proposed for this Site. The adequacy and reliability of a treatment berm concept at a site like the Tulalip Landfill is highly uncertain. A containment berm project that has been implemented at the Port of Seattle's Terminal 91 has been suggested by the Respondents as a successful precedent for installing a treatment berm system at Tulalip. However, EPA's review of the Terminal 91 project indicates that the Terminal 91 project is not analogous to the berm system proposed for Tulalip Landfill, and is not a good predictor or indicator of success for treatment at Tulalip Landfill. For example, the Terminal 91 berm was designed to immobilize and contain PAHs and PCBs. This is a fundamentally different objective than treating, chemically degrading, and dispersing wastes, as proposed at the Tulalip Site. Chemically, the waste materials very different, and the flux rates and systems to move water are much more complex at the Tulalip Site.<sup>3</sup> The ability of the proposed treatment berm system at Tulalip Landfill to treat most or all of the contaminants of potential concern at both Terminal 91 and the Tulalip Landfill remains undocumented. The Respondents have acknowledged that "the effectiveness of the treatment berms under these (i.e., Tulalip) site conditions for this leachate cannot be confirmed until after implementation."<sup>4</sup> In other words, the only way to really know if the system would work is to build it and then attempt to evaluate whether it is effective.

Based on EPA's evaluation of technical information regarding the Terminal 91 project, EPA finds no basis to conclude that contaminant concentrations were reduced within the Terminal 91 berm by any means other than dilution (i.e., mixing of contaminated ground water with "clean" surface water within the berm). Further, no information has been presented to EPA showing that such a berm treatment system has ever been implemented at a landfill site, so its effectiveness at a Site like Tulalip landfill is unknown. If either the collection system or the berm proposed for Alternative 2b turns out to be ineffective, significant damage to the environment could result, and subsequent implementation of effective contingent measures (such

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<sup>3</sup> See Memorandum by Eric Winiecki to The File, August 4, 1995, regarding EPA Review of Alternative 2b - Treatment Berm (see especially attached memoranda by Glenn Bruck and Rene Fuentes) in the Administrative Record for this interim ROD.

<sup>4</sup> See Memorandum by Eric Winiecki to The File, August 4, page 2.



as a landfill cover and other identified measures) would significantly increase the costs of the containment remedy.

EPA also has concerns regarding the long-term effectiveness of the basic leachate collection system concept proposed for the Treatment Berm alternative (2b) and the Discharge to POTW [2b(ii)] alternative. No information has been provided to EPA that shows such a collection system, requiring thousands of feet of drainage trenches constructed within landfill waste, has ever been implemented at any site. EPA believes there is a high risk of these collection systems clogging in the long term as a result of accumulation in the collection system of chemical precipitates, microorganism growths, or settlement of particulates, which could result in high operation and maintenance (O&M) costs to address the problems, or a future need to install a more effective remedy, such as a low permeability landfill cover. The gradients proposed for the collection trenches would provide little tolerance for errors in the placement and elevation of the pipes in the interceptor trenches. Such precision could be difficult to achieve considering the potentially variable nature of the substrate (silts, sands, clays and waste materials) on which the pipe would be laid. The potential for differential settlement of wastes and sediment would be difficult to predict. The installation of the trenches also calls for the addition of approximately 20 feet of materials over the pipes. This additional load would increase the potential for pipe settlement and gradient changes after the pipe has been laid. Such changes may result in flow stagnation and ineffective drainage.<sup>5</sup>

The occurrence of any or all of these problems would mean that the carefully modeled flows and infiltration rates would be changed. The probable result would be increased infiltration down into Zone two (and possibly to the perimeter berm leachate seeps) and less water flowing through the collection system.

Because of the relatively high potential for collection system ineffectiveness or failure, EPA considers Alternatives 2b and 2b(ii) to be impermanent relative to alternatives that employ proven landfill containment technologies such as low permeability covers. Alternative 2b(ii) is also considered to be impermanent because of its relatively high O&M costs.<sup>6</sup> In addition, because most of the predicted O&M costs associated with 2b(ii) are for POTW treatment, the future viability of this alternative would be vulnerable to any unforeseen increases in the price of POTW

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<sup>5</sup> See Memorandum by Eric Winiecki to The File, August 4, page 2. See especially attached memorandum by Glenn Bruck.

<sup>6</sup> EPA's O&M cost estimate for Alternative 2b(ii) is \$465,000 per year; the Respondents' estimate is \$386,000 per year.



treatment. This system would also be vulnerable to any future increases in the cost of power to run the collection system pumps.

The Seep and Zone 2 Ground Water Controls alternative (3) may not be effective in the long term. Because Site investigations have found that there is no consistent aquitard in which a slurry wall could be effectively anchored in Zone 2, the ability of this alternative to effectively ensure the collection of leachate and ground water is uncertain. This is an active system with a relatively high reliance on an outside power source, and it is considered to be relatively impermanent because of its relatively high O&M costs.<sup>7</sup>

4. Reduction of Toxicity, mobility, or volume through treatment evaluates an alternatives's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of residual contamination remaining.

Alternative 3 - Leachate Seep and Ground Water Collection and Treatment, and Alternative 2b(ii) - Leachate Collection with Discharge to POTW, are expected to meet this criterion because leachate would be pumped to a POTW for treatment. However, information has not been provided to EPA that shows that the POTW treatment systems are capable of effectively treating all of the contaminants of concern in the leachate.

Alternatives that do not meet this criterion are:

- 2b Leachate Collection with Treatment Berm
- 4a Soil Cover with Passive Drainage
- 4b Geosynthetic Cover with Active Drainage

The Leachate Collection with Treatment Berm alternative (2b) is considered not to meet this criterion because its ability to treat contaminants is uncertain. In addition, the potential for significant clogging of the Treatment Berm could result in the release of untreated contaminants. Paradoxically, if the treatment berms turn out to be ineffective at treating the leachate, and the collection system has the effect of mobilizing contaminants that otherwise would have remained in place, this alternative could result in greater amounts of contaminants discharging to the environment than current levels. Alternatives 4a and 4b are alternatives that are generally consistent with the presumptive remedy approach of containment; they would not employ any form of treatment.

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<sup>7</sup> The O&M cost estimate for Alternative 3 is \$620,000 per year.



5. Short-term effectiveness considers how fast the alternative reaches the cleanup goal and the risks the alternative poses to workers, residents, and the environment during construction or implementation of the alternative.

None of these alternatives (2b, 2b(ii), 3, 4a, and 4b) is expected to pose risk to the surrounding community during construction or implementation because the Site is relatively isolated. Any significant impacts would likely be confined to the immediate vicinity of the Site.

All of these alternatives would potentially pose some risk to workers because all involve some excavation of waste. Excavation in landfills is a relatively common practice, and EPA anticipates that effective measures would be taken to mitigate risks. However, alternatives 2b and 2b(ii), which involve digging trenches through the waste, could pose significant risks to workers, relative to other alternatives. The trenches, which would be 3 feet wide and up to 17 feet deep, would be expected to partially fill with standing leachate during construction. If it becomes necessary for workers to enter the trenches during construction, either to facilitate digging the trenches or installing the drainage system inside the trenches, there is a potential for trench cave-ins, and greater worker exposure to landfill waste, leachate, and gas. Workers would need to wear appropriate protective gear and work in confined space conditions, which can be expensive and relatively dangerous. EPA is unaware of any other Site where similar trenches have been constructed in landfill waste. Unanticipated safety issues could arise during construction.

These alternatives would have at least some short-term adverse impact on the environment during implementation or construction. For example, if the Leachate Collection with Treatment Berm alternative (2b) is not effective at treating leachate, it could worsen environmental conditions by mobilizing additional leachate and releasing it to the environment. Alternatives 2b and 2b(ii) would unearth large quantities of waste which would not be treated or contained under a low permeability cover. The capping alternatives 4a and 4b would require importing fill material to bring the landfill surface up to the 2% minimum grades required by the MFS.<sup>8</sup> The additional weight of imported fill on the landfill could cause a short-term increase in the rate of leachate migration through the perimeter seeps and down into Zone 2, but potential problems such as this are typically addressed during detailed design. Because the Geosynthetic Cover with Active Drainage alternative (4b) would

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<sup>8</sup> However, the amount of off-site fill that would need to be imported can be reduced by re-positioning existing landfill materials to achieve the necessary grades.



require less excavation and less imported fill material than the passive cover designs, it may have less short-term adverse impact on the environment during construction.

Alternatives 3 and 4b would likely achieve the cleanup objective for eliminating the release of leachate from surface seeps. Alternative 3 - Seep and Zone 2 Ground Water Controls, is expected to meet the cleanup goals for the leachate seeps immediately after implementation. This alternative would utilize active pumping of leachate, which would result in faster elimination of the seeps. Alternative 4b - Geosynthetic Cover with Active Drainage, is predicted to "dry up" the leachate seeps and meet surface water ARARs at the sloughs within 2 years of construction completion. This alternative would cut off infiltration of rain water through the waste, thus minimizing the generation of new leachate.

Ground water modeling conducted by the Respondents during the Remedial Investigation (RI) suggests that Alternative 4a, Soil Cover with Passive Drainage, would not reduce infiltration enough to eliminate the perimeter seeps.

It is uncertain whether alternatives 2b - Leachate Collection with Treatment Berm, and 2b(ii) - Leachate Collection with Discharge to POTW, would be effective in lowering the leachate mound enough to result in the elimination of the Zone 1 perimeter seeps. EPA has additional concerns about the Treatment Berm concept proposed for Alternative 2b because such a system has never been implemented at a site like Tulalip Landfill, and its effectiveness is uncertain. It is possible that actual "treatment" within the berm may never occur. Until conditions within the berms developed that would enable treatment to occur (if ever), this alternative would permit the release of significant quantities of contaminated leachate into the surface waters after passing it, untreated, through the berms.

EPA has received no information which shows that the leachate collection system concept proposed for Alternatives 2b and 2b(ii) has ever been implemented at a Site like the Tulalip Landfill. The Respondents who submitted these alternatives claim that they would be immediately effective in stopping the leachate seeps. However, because of potential delays associated with the administrative and technical obstacles associated with these alternatives (see discussion of NCP criterion number 6 - Implementability), their short-term effectiveness is considered uncertain.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, such as the relative availability of goods and services. Also, it considers whether the technology has been used successfully on other similar sites.



Alternative 4b - Geosynthetic Cover with Active Drainage, is implementable at the Site. Technically, construction of a landfill cover is a common landfill remedy that can be readily implemented at Tulalip Landfill. In general, materials for these types of covers are available. The most significant difference in implementability with the Tulalip Landfill is that it is flat, so that a mounded cover must be constructed with surface water runoff controls to minimize infiltration and generation of leachate. A cover with an active surface water handling design requires the importation of less fill material than the cover alternatives that employ "passive" drainage. However, the active drainage cover does not comply with Washington State Minimum Functional Standards (MFS), which require minimum 2% surface slopes of the cover system. This alternative, which involves an active pumping system to move rainwater off the cover, would require provision of a power source or power line out to the landfill.

One aspect of implementability is the ability to monitor the remedy's effectiveness, and the ease of maintaining the remedy. Based on EPA's experience at other CERCLA landfills across the country, geosynthetic covers have a known performance record and are relatively reliable if properly constructed. It would be relatively easy to monitor the leachate seeps to evaluate if they dry up. Water levels in piezometers located on the landfill could be monitored to evaluate whether the leachate mound within the waste is falling, which would indicate that leachate migration through the deeper ground water is being reduced. An advantage of a landfill cover is that if an obvious problem becomes apparent, such as surface water ponding in the case of the passive cover, it is relatively easy to access and make repairs to the cover because the cover system is located on the surface of the landfill. All covers develop leaks, and installing a leak detection system beneath the cover would not be practical.

Based on current information, the following alternatives are considered significantly less implementable:

- 2b Leachate Collection with Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW
- 3 Seep and Zone 2 Ground Water Controls

Materials to construct these alternatives should be readily available. Because the collection systems for the Treatment Berm alternative (2b), and the Discharge to POTW alternative [2b(ii)], have never been implemented at a site like the Tulalip Landfill, some of the possible technical difficulties that may be encountered during construction are unknown. For example, in constructing the collection system, it would likely be difficult to construct trenches 3 feet wide and 17 feet deep through the landfill waste, which includes large pieces of debris such as



concrete slabs and wood pilings. It may also prove very difficult to install level collection pipes in several feet of standing water, which would be expected to collect in the trenches during construction. Once constructed, the collection system or berm could develop unforeseen problems that could be difficult to correct, especially since the system is constructed largely underground and may be difficult to access to make some types of required repairs. Although it may be feasible to clean out the drainage trench pipes if sumps are included in the design, correcting serious clogging problems that may develop in the granular drainage material in the trenches could require excavating and replacing portions of the trench collection system, which would likely be difficult, costly, and may interfere with future land use activities.

Because up to 95% dilution of existing contaminants is expected in the berms proposed for the Treatment Berm alternative (2b), it would be very expensive or impossible to monitor whether the berms were achieving significant treatment of the leachate or mere dilution with the slough water. The Respondents estimate that 2.8 acres of off-source wetlands would be adversely impacted or lost in order to construct the proposed treatment berms. The Respondents propose to establish 4.8 acres of "new" wetlands on top of the treatment berms. However, EPA believes it is unlikely that functional wetlands could be maintained on top of the berms given the likelihood that, due to rapid pore space clogging, portions of the berms may need to be excavated and replaced on a regular basis. In EPA's view, the Respondents' proposal would dredge and fill existing high quality wetlands and replace them with frequently disturbed, low quality wetlands. Because construction of the Treatment Berms would require destruction of about twice the amount of wetlands than would the cover alternatives (approximately 1.7 acres), administrative difficulty is anticipated in complying with the requirements of CWA 404(b)(1). CWA 404(b)(1) requires avoidance of wetland destruction if alternative actions are available, and in this case, there are other viable remedial alternatives (i.e., capping) that are expected to effectively contain the landfill wastes and would entail destruction of fewer acres of off-source wetlands.

With regard to the Discharge to POTW alternative [2b(ii)], delays could result from administrative difficulties with obtaining permits and access for construction of the proposed sewer line to the POTW. The Respondents' October 25, 1995, submittal included a September 28, 1995, letter from Gene Bennett of the Everett POTW to Mr. Scott Kindred of Golder Associates which indicated that the POTW saw no technical reason that the Everett Water Pollution Control Facility could not accept the discharge of this wastewater at the flow rates proposed by the Respondents. However, the letter from the Respondents to the POTW in which the Respondents described the Tulalip Landfill



leachate and its constituents has not been provided to EPA. Nor has an analysis which demonstrates to EPA that the Everett POTW would effectively treat all of the constituents in the Tulalip Landfill leachate been provided. Access would need to be obtained to construct the pipe across at least one private property parcel, and the pipe would also need to cross the Burlington Northern railroad tracks and a highway. Obtaining access for the discharge pipe could substantially delay implementation of this alternative.

The Seep and Zone 2 Ground Water Controls alternative (3) is considered relatively infeasible because of the difficulty in constructing a slurry wall down into the Zone 2 aquifer. Problems such as heaving sands could make construction of such a slurry wall difficult or impossible.

7. Cost includes estimated capital and operation and maintenance costs, as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollars. Cost comparison information for these alternatives is provided in Table 9-1 in the interim ROD. The net present value of each alternative includes capital and O&M costs, and were calculated assuming a discount rate of 5% over 30 years.

As shown in interim ROD Table 9-1, EPA and the Respondents have developed different cost estimates for Alternatives 2b - Leachate Collection with Discharge to Treatment Berm; 2b(ii) - Leachate Collection with Discharge to POTW; and 4b - Geosynthetic Cover with Active Drainage. With regard to Alternative 4b, EPA has added a contingency cost of \$2.7 million to the Respondents' cost estimate from the SAC FS to allow for the possibility that landfill gas will need to be treated to comply with Puget Sound Air Pollution Control Authority (PSAPCA) requirements. In relative terms, EPA's cost estimate for Alternative 4b (\$21.3 million) does not differ substantially from the Respondents' estimate (\$18.6 million).

After reviewing and evaluating the Respondents' cost estimates for Alternatives 2b and 2b(ii), EPA has concluded that the Respondents incorporated some unrealistic assumptions into developing these cost estimates. In effect, the Respondents assumed a "best case" (i.e. extremely low) cost scenario with regard to Alternatives 2b and 2b(ii) that they did not use in developing cost estimates for other alternatives. The result is that their cost estimates for these two alternatives are inappropriately low. Given the unproven nature of the technologies employed by Alternatives 2b and 2b(ii), and the relatively low level of certainty regarding the potential implementability and effectiveness of these alternatives at the Site, EPA believes that more realistic, conservative assumptions should have been used so that the relative costs of these



alternatives can be properly compared to the estimated costs of other alternatives in the analysis, as required by the NCP. Therefore, EPA has independently developed cost estimates for these two alternatives, using more realistic, conservative assumptions.

For example, with regard to the collection system, which is similar for both Alternatives 2b and 2b(ii), EPA's cost assumptions differed from the Respondents' on the following basic points:

- EPA believes that the Respondents' estimate of the necessary distance between collection trenches is not sufficiently conservative. The Respondents assumed the refuse layer to be more horizontally permeable than it may actually be (more testing would be needed to more accurately estimate this permeability), and they concluded that the trenches should be spaced 400 feet apart. Based on the current degree of uncertainty regarding the horizontal permeability of the waste, EPA believes a lower permeability should be assumed, and EPA has accordingly concluded for the purposes of the cost estimate that the trenches should be spaced 200 feet apart. EPA has added four additional sumps for the additional drainage pipe to accommodate the reduced trench spacing.
- The Respondents were unclear about what would be done with some of the excavated waste from the trenches; EPA included an estimate for off-site disposal of this waste in a solid waste landfill.
- The Respondents did not appear to have included increased costs due to handling saturated trench spoils; EPA included costs for hauling and storing the spoils on a stockpile pad composed of HDPE and sand to prevent further contamination of the landfill surface.
- To alleviate trench instability during wet excavation, EPA included costs for the use of a trench box and 40% over-excavation to lay back trench walls.
- EPA assumed a one-foot topsoil cover over 1/2 the landfill would be necessary to prevent human exposure to wastes and contaminated soil (the landfill surface would require additional chemical characterization to determine the appropriate extent of such cover material).

Specifically regarding the treatment component of Alternative 2b, EPA made the following cost assumptions concerning the proposed treatment berm system:



- EPA assumed a more conservative cost for sheet pile of \$12 per square foot.
- EPA included the cost of increasing the height of the treatment berms by 5 feet to prevent leachate blowouts at the berm surface, which EPA believes may occur at the berm height proposed by the Respondents.
- Potential O&M costs for the treatment berm system is highly uncertain because of the unproven nature of treatment berms at a Site like the Tulalip Landfill. Because EPA is very concerned that the berms could experience significant problems due to plugging of the pore spaces within the berm by metal precipitates and biosludges, EPA has incorporated costs for partial replacement of the treatment berms every 10 years. However, EPA notes that even this increased cost estimate could seriously underestimate the actual cost of O&M for the berms if plugging turns out to be a serious problem after the system is constructed.

Specifically regarding the treatment component of Alternative 2b(ii), EPA made the following cost assumptions concerning the proposed discharge to a POTW:

- EPA updated the waste disposal costs for excess trench spoils to \$60 per cubic yard to reflect disposal facility tipping fees (\$42 per cubic yard) as well as loading and hauling costs (\$18 per cubic yard).
- EPA increased the O&M cost for the 24 extraction wells to allow for monthly inspections and periodic repair and/or replacement of each pump at an annual cost of \$1,250 per pump.
- Costs for POTW disposal of the leachate were increased based on current estimates from the POTWs.

In summary, EPA believes that the higher cost estimates EPA has developed for Alternatives 2b and 2b(ii) are more accurate than the cost estimates provided by the Respondents. EPA's cost estimates account for more of the uncertainty that is inherent in the unproven 2b and 2b(ii) alternatives, and allow more realistic comparison of the costs of these alternatives with the other alternatives that EPA has evaluated using the NCP criteria in the interim ROD. For additional information on how and why EPA's cost assumptions for Alternatives 2b and 2b(ii) differ from the Respondents', see the interim ROD Appendix E, and also EPA's August 3, 1995, comment letter on Alternative 2b, which is available in the administrative record).



# **Interim Remedial Action ROD**

## **APPENDIX B**



**Appendix B:  
Cost Estimate for  
Contingent Landfill Gas Treatment System<sup>1</sup>**

Figure 10-1 in the interim ROD depicts a decision tree for the gas collection and treatment contingent cost estimate. The costs estimates that were used in the decision tree are shown in the tables in this appendix. The decision tree in Figure 10-1 identifies seven different contingent solutions. EPA plans to incorporate one of these contingent solutions into the landfill cap design if EPA determines that landfill gas control is needed. The seven cost tables correspond to the seven solutions shown on the decision tree; a discussion of each follows:

- Table 4A assumes a passive vent system. This system includes a 6-inch sand layer under a geomembrane cap. This layer will act as a bedding layer for the geomembrane cap and will allow gas to move horizontally under the cap. One vent per acre will penetrate the cap system. Each vent will have a limited amount of horizontal perforated pipe traveling horizontally through the sand layer to gather gas. The O&M costs shown in the table account for inspection of the vents and replacement if any vent becomes plugged.
- Table 4B assumes a horizontal trench system with an open flare. This system includes a 2- to 3-foot-wide by 6-to 10-foot-deep trench including a perforated pipe running the length of the trench with periodic standpipes to remove the gas from the trench. The trenches would run the length of the landfill and be spaced 75 feet apart. A blower is included to supply a small vacuum to the system, and an open flare is included to burn the removed gas. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30 year period.
- Table 4C assumes a horizontal trench system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4B. The only difference is this table includes an enclosed flare system which costs slightly more to purchase and maintain; however, it is more efficient than the open flare system.
- Table 4D assumes a vertical well system with an open flare. The system includes perforated gas extraction wells on a 100- by 100-foot grid system over the entire landfill. These wells are connected to a blower and open flare via an overland piping system. The wells are assumed to vary in depth from 10 to 30 feet, on average 20 feet deep. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30-year period.

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<sup>1</sup> The source of this Appendix is an August 1, 1995, letter from Keith Pine of Weston, Inc., to Eric Winiecki of EPA. This letter is included in Section 3.1 of the Administrative Record for the Tulalip Landfill interim remedial action.



- Table 4E assumes a vertical well system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4D. The only difference is this table includes an enclosed flare system.
- Table 4F assumes a surface collection system with an open flare. The system includes a 6-inch sand layer under the geomembrane cap. This layer allows the gas to move horizontally under the cap. A standpipe will penetrate the liner and connect to a predetermined amount of perforated horizontal piping within the sand layer. One stand pipe with horizontal piping will be installed per acre. These standpipes will be connect to a blower and open flare via an overland piping system. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30-year period.
- Table 4G assumes a surface collection system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4F. The only difference is this table includes an enclosed flare system.



**Table 4A--Landfill Gas Contingency--Passive Vent System**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
Install Passive Vents				
Mobilization/Demobilization	1	LS	\$7,500	\$7,500
Sand Layer (6" Vent Layer)	120,000	CY	\$6	\$720,000
Vents (1/Acre)	147	EA	\$500	\$73,500
Subtotal Capital Costs				\$801,000
EPA Oversight				\$28,890
Contractor Overhead and Profit (10%)				\$80,100
Engineering (15%)				\$120,150
Contingency (25%)				\$200,250
Total Capital Costs				\$1,230,390
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Vent Maintenance	1/yr	LS	\$10,000	\$10,000
Subtotal O&M Costs				\$10,000
Contingency (25%)				\$2,500
Total O&M Costs				\$12,500
Net Present Value of O&M Costs (30 years, 5%)				\$192,150
Total Cost (Net Present Value)				\$1,422,540



**Table 4B--Landfill Gas Contingency--Horizontal Trench System (Open Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
Install Trench System				
Mobilization/Demobilization	1	LS	\$20,000	\$20,000
Horizontal Trenching and Piping	85,400	LF	\$25	\$2,135,000
Flare and Blower	1	EA	\$160,000	\$160,000
Subtotal Capital Costs				\$2,315,000
EPA Oversight				\$72,220
Contractor Overhead and Profit (10%)				\$231,500
Engineering (15%)				\$347,250
Contingency (25%)				\$578,750
Total Capital Costs				\$3,544,720
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$75,000	\$75,000
Subtotal O&M Costs				\$75,000
Contingency (25%)				\$18,750
Total O&M Costs				\$93,750
Net Present Value of O&M Costs (30 years, 5%)				\$1,441,125
Total Cost (Net Present Value)				\$4,985,845



**Table 4C--Landfill Gas Contingency--Horizontal Trench System (Enclosed Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
<b>Install Trench System</b>				
Mobilization/Demobilization	1	LS	\$20,000	\$20,000
Horizontal Trenching and Piping	85,400	LF	\$25	\$2,135,000
Flare and Blower	1	EA	\$200,000	\$200,000
Subtotal Capital Costs				\$2,355,000
EPA Oversight				\$86,660
Contractor Overhead and Profit (10%)				\$235,500
Engineering (15%)				\$353,250
Contingency (25%)				\$588,750
<b>Total Capital Costs</b>				<b>\$3,619,160</b>
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$80,000	\$80,000
Subtotal O&M Costs				\$80,000
Contingency (25%)				\$20,000
<b>Total O&amp;M Costs</b>				<b>\$100,000</b>
<b>Net Present Value of O&amp;M Costs (30 years, 5%)</b>				<b>\$1,537,200</b>
<b>Total Cost (Net Present Value)</b>				<b>\$5,156,360</b>



**Table 4D--Landfill Gas Contingency--Vertical Well System (Open Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
<b>Install Well System</b>				
Mobilization/Demobilization	1	LS	\$15,000	\$15,000
Vertical Wells	640	EA	\$2,500	\$1,600,000
Flare and Blower	1	EA	\$160,000	\$160,000
Subtotal Capital Costs				\$1,775,000
EPA Oversight				\$72,220
Contractor Overhead and Profit (10%)				\$177,500
Engineering (15%)				\$266,250
Contingency (25%)				\$443,750
<b>Total Capital Costs</b>				<b>\$2,734,720</b>
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$95,000	\$95,000
Subtotal O&M Costs				\$95,000
Contingency (25%)				\$23,750
<b>Total O&amp;M Costs</b>				<b>\$118,750</b>
<b>Net Present Value of O&amp;M Costs (30 years, 5%)</b>				<b>\$1,825,425</b>
<b>Total Cost (Net Present Value)</b>				<b>\$4,560,145</b>



**Table 4E--Landfill Gas Contingency--Vertical Well System (Enclosed Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
<b>Install Well System</b>				
Mobilization/Demobilization	1	LS	\$15,000	\$15,000
Vertical Wells	640	EA	\$2,500	\$1,600,000
Flare and Blower	1	EA	\$200,000	\$200,000
Subtotal Capital Costs				\$1,815,000
EPA Oversight				\$86,660
Contractor Overhead and Profit (10%)				\$181,500
Engineering (15%)				\$272,250
Contingency (25%)				\$453,750
<b>Total Capital Costs</b>				<b>\$2,809,160</b>
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$105,000	\$105,000
Subtotal O&M Costs				\$105,000
Contingency (25%)				\$26,250
<b>Total O&amp;M Costs</b>				<b>\$131,250</b>
<b>Net Present Value of O&amp;M Costs (30 years, 5%)</b>				<b>\$2,017,575</b>
<b>Total Cost (Net Present Value)</b>				<b>\$4,826,735</b>



**Table 4F--Landfill Gas Contingency--Surface Collection System (Open Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
Install Collection System				
Mobilization/Demobilization	1	LS	\$20,000	\$20,000
Sand Layer (6" Vent Layer)	120,000	CY	\$6	\$720,000
Vents (1/Acre) Includes Overland Pipe	147	EA	\$1,000	\$147,000
Flare and Blower	1	EA	\$160,000	\$160,000
Subtotal Capital Costs				\$1,047,000
EPA Oversight				\$72,220
Contractor Overhead and Profit (10%)				\$104,700
Engineering (15%)				\$157,050
Contingency (25%)				\$261,750
Total Capital Costs				\$1,642,720
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$60,000	\$60,000
Subtotal O&M Costs				\$60,000
Contingency (25%)				\$15,000
Total O&M Costs				\$75,000
Net Present Value of O&M Costs (30 years, 5%)				\$1,152,900
Total Cost (Net Present Value)				\$2,795,620



**Table 4G--Landfill Gas Contingency--Surface Collection System (Enclosed Flare)**

Item	Quantity	Units	Unit Cost	Cost
<b>Capital Costs</b>				
Install Collection System				
Mobilization/Demobilization	1	LS	\$20,000	\$20,000
Sand Layer (6" Vent Layer)	120,000	CY	\$6	\$720,000
Vents (1/Acre) Includes Overland Pipe	147	EA	\$1,000	\$147,000
Flare and Blower	1	EA	\$200,000	\$200,000
Subtotal Capital Costs				\$1,087,000
EPA Oversight				\$72,220
Contractor Overhead and Profit (10%)				\$108,700
Engineering (15%)				\$163,050
Contingency (25%)				\$271,750
<b>Total Capital Costs</b>				<b>\$1,702,720</b>
<b>Operation &amp; Maintenance (O&amp;M) Costs</b>				
Flare and Blower Maintenance	1/yr	LS	\$65,000	\$65,000
Subtotal O&M Costs				\$65,000
Contingency (25%)				\$16,250
<b>Total O&amp;M Costs</b>				<b>\$81,250</b>
<b>Net Present Value of O&amp;M Costs (30 years, 5%)</b>				<b>\$1,248,975</b>
<b>Total Cost (Net Present Value)</b>				<b>\$2,951,695</b>



# **Interim Remedial Action ROD**

## **APPENDIX B**



**Appendix B:  
Cost Estimate for  
Contingent Landfill Gas Treatment System<sup>1</sup>**

Figure 10-1 in the interim ROD depicts a decision tree for the gas collection and treatment contingent cost estimate. The costs estimates that were used in the decision tree are shown in the tables in this appendix. The decision tree in Figure 10-1 identifies seven different contingent solutions. EPA plans to incorporate one of these contingent solutions into the landfill cap design if EPA determines that landfill gas control is needed. The seven cost tables correspond to the seven solutions shown on the decision tree; a discussion of each follows:

- Table 4A assumes a passive vent system. This system includes a 6-inch sand layer under a geomembrane cap. This layer will act as a bedding layer for the geomembrane cap and will allow gas to move horizontally under the cap. One vent per acre will penetrate the cap system. Each vent will have a limited amount of horizontal perforated pipe traveling horizontally through the sand layer to gather gas. The O&M costs shown in the table account for inspection of the vents and replacement if any vent becomes plugged.
- Table 4B assumes a horizontal trench system with an open flare. This system includes a 2- to 3-foot-wide by 6-to 10-foot-deep trench including a perforated pipe running the length of the trench with periodic standpipes to remove the gas from the trench. The trenches would run the length of the landfill and be spaced 75 feet apart. A blower is included to supply a small vacuum to the system, and an open flare is included to burn the removed gas. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30 year period.
- Table 4C assumes a horizontal trench system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4B. The only difference is this table includes an enclosed flare system which costs slightly more to purchase and maintain; however, it is more efficient than the open flare system.
- Table 4D assumes a vertical well system with an open flare. The system includes perforated gas extraction wells on a 100- by 100-foot grid system over the entire landfill. These wells are connected to a blower and open flare via an overland piping system. The wells are assumed to vary in depth from 10 to 30 feet, on average 20 feet deep. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30-year period.

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<sup>1</sup> The source of this Appendix is an August 1, 1995, letter from Keith Pine of Weston, Inc., to Eric Winiecki of EPA. This letter is included in Section 3.1 of the Administrative Record for the Tulalip Landfill interim remedial action.



- Table 4E assumes a vertical well system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4D. The only difference is this table includes an enclosed flare system.
- Table 4F assumes a surface collection system with an open flare. The system includes a 6-inch sand layer under the geomembrane cap. This layer allows the gas to move horizontally under the cap. A standpipe will penetrate the liner and connect to a predetermined amount of perforated horizontal piping within the sand layer. One stand pipe with horizontal piping will be installed per acre. These standpipes will be connect to a blower and open flare via an overland piping system. The O&M costs account for yearly maintenance, inspection, and one replacement of the flare and blower over the 30-year period.
- Table 4G assumes a surface collection system with an enclosed flare. This table is nearly identical in form and assumptions as Table 4F. The only difference is this table includes an enclosed flare system.



# **Interim Remedial Action ROD**

## **APPENDIX C**



**Appendix C:  
Guidance Documents for the  
Landfill Cover System**

Solid Waste Landfill Design Manual, June 1987, Publication No.87-13. Prepared by Parametrix, Inc. for Washington Department of Ecology.

Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047.

Technical Guidance Document: The Fabrication of Polyethylene FML Field Seams, EPA/530/SW-89-069.

Seminar Publication Design and Construction of RCRA/CERCLA Final Covers, EPA/625/4-91/025.

Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051.

Solid Waste Disposal Facility Criteria Technical Manual, EPA 530-R93-017.

Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182.

Report of Workshop on Geosynthetic Clay Liners, EPA/600/R-93/171.

Proceedings of the Workshop on Geomembrane Seaming Data Acquisition and Control, EPA/600/R-93/112.

The Hydrologic Evaluation of Landfill Performance (HELP) Model User's Guide for Version 3, EPA/600/R-94/168a.

The Hydrologic Evaluation of Landfill Performance (HELP) Model Engineering Documentation for Version 3, EPA/600/R-94/168b.



# **Interim Remedial Action ROD**

## **APPENDIX D**



RESPONSIVENESS SUMMARY  
TULALIP LANDFILL

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ATTACHMENT C: LIST OF REFERENCES



## LIST OF COMMENTORS

As part of the formal remedy selection process, public comments were solicited on EPA documents related to the Proposed Plan for Interim Remedial Action at the Tulalip Landfill. All public comments received are contained in the following documents:

1. Transcript from the Public Meeting of August 22, 1995
2. Transcript from the Public Meeting of October 3, 1995
3. AOC Respondents Comments on EPA's Proposed Plan for Interim Remedial Action at the Tulalip Landfill
4. Letter from Snohomish Health District
5. Letter from Balance Council
6. Letter from Sato Corporation
7. Letter from NW Indian Fisheries Commission
8. Letter from Lake Union Drydock Company
9. Letter from Achilles USA Inc.
10. Letters from the Tulalip Tribes
11. Letter from People for Puget Sound
12. Comment sheet from Mark Lindberg
13. Letter from Fog-Lite
14. Letter from Buffalo Industries
15. Telephone logs from unidentified private citizens
16. Letter from Pilchuck Audubon Society
17. Letter from Crow Roofing and Sheet Metal, Inc.
18. Letter from Marco Shipyard



## TERMS COMMONLY USED IN THE RESPONSIVENESS SUMMARY

The following is a list of terms and unique definitions as used throughout the Responsiveness Summary. EPA is including these definitions for purposes of clarity.

- a. source or on-source area -- is considered to include approximately 147 acres of waste, groundwater in and beneath the waste, cover material and the surrounding perimeter landfill berm.
- b. off-source area -- is considered to include any part of the Site that is located outside the perimeter berm.
- c. streamlined baseline risk assessment -- refers to the risk assessment performed for the on-source area of the Tulalip Site as part of the remedial investigation and remedy selection process (i.e., the RI/FS). In the Proposed Plan and the Risk Assessment for Interim Remedial Action, EPA referred to the risk assessment and its process as a "screening" assessment. After evaluating public comments on the Proposed Plan, it is apparent that some commentors were misled by EPA's use of the phrase "screening" to refer to the risk assessment process used for evaluating the on-source area of the Tulalip Site. Therefore, EPA is now more appropriately and accurately referring to the risk assessment for the source area as a Streamlined Risk Assessment, rather than a screening level risk assessment. The Streamlined Risk Assessment has been completed.
- d. comprehensive baseline risk assessment (CBRA) -- refers to the risk assessment for the off-source area of the Tulalip Site. This risk assessment is ongoing.
- e. interim (action) ROD -- refers to the remedial action decision document for the on-source area of the Site.
- f. cap/cover -- refers to a component of the selected remedial action. A cap or cover are terms used to describe a method of containment which employs a covering or cap to prevent contact exposure or infiltration of precipitation.



g. Zone 1 aquifer -- refers to the leachate mound which has accumulated in the refuse layer. When precipitation falls on the landfill, most of the rainwater infiltrates down through the soil cover and sinks down into the refuse layer, picking up contamination from the waste as it moves through. A discontinuous silt layer underlies the refuse and the Zone 1 aquifer throughout much of the landfill.

h. Zone 2 -- refers to the groundwater under Zone 1 and the discontinuous silt layer.

i. comparison numbers -- refers to established standards and criteria, and calculated risk-based chemical concentrations, that are generally considered to be protective of human health and the environment. Most of these comparison numbers, with the exception of ecological soil risk-based concentrations, have been established or developed under federal or state law.

After evaluating public comments on the Proposed Plan, it is apparent to EPA that some commentors were misled by EPA's use of the phrase "screening criteria" in the Streamlined Risk Assessment to refer to standards, criteria and risk-based chemical concentrations used in the Streamlined Risk Assessment. To clarify this issue, EPA is using a more accurate phrase "comparison numbers" to refer to standards, criteria and risk-based chemical concentrations. EPA notes that these comparison numbers have been selected for use in the Streamlined Risk Assessment for the purpose of evaluating potential risks posed by the Site. These comparison numbers are not necessarily ARARs. ~~ARARs.~~

j. AOC Respondents -- generally refers to the Potentially Responsible Parties (PRPs) who signed the RI/FS Administrative Order on Consent, dated August 1993.



## LIST OF ACRONYMS USED IN THIS DOCUMENT

AET	Apparent Effects Threshold
AMBS	Area of Major Biological Significance
AOC	Administrative Order on Consent
AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
AWQC	Ambient Water Quality Criteria
BIA	Bureau of Indian Affairs
CBRA	Comprehensive Baseline Risk Assessment
CCMP	Comprehensive Coastal Management Plan
C.F.R.	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FML	Flexible Membrane Liner
FS	Feasibility Study
FWQC	Federal Water Quality Criteria
MCC	Marine Chronic Criteria
MFS	Minimal Functional Standards (Washington State MFS regulations for landfill closure)
MTCA	Model Toxics Control Act
NCP	National Contingency Plan
NEP	National Estuary Program
NPL	National Priorities List
O&M	Operation and Maintenance



OU	Operable Unit
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly Owned Treatment Works
PP	Proposed Plan
PRPs	Potentially Responsible Parties
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objectives
RBC	Risk-Based Concentrations
RCW	Revised Code of Washington
RI	Remedial Investigation
ROD	Record of Decision
REAC (Weston)	Response Engineering and Analytical Contract
SDC	Seattle Disposal Company
SRA	Streamlined Baseline Risk Assessment
SMS	Sediment Management System
SQS	Sediment Quality Standards
TOC	Total Organic Content
TRV	Toxicity Reference Value
WAC	Washington Administrative Code
WQS	Water Quality Standards
U.S.C.	United States Code



**RESPONSIVENESS SUMMARY  
FOR THE  
TULALIP LANDFILL  
INTERIM ROD**

**1.0 OVERVIEW**

This section provides a "roadmap" of the Agency's decision making process regarding the interim remedial action at the Tulalip Landfill and a brief discussion of the organization of the Responsiveness Summary.

**1.1 PERSPECTIVE ROADMAP FOR DECISIONMAKING**

This "roadmap" of the Agency's decision-making (1) shows how presumptive remedy approach works, (2) why Tulalip fits into that approach and why it is appropriate for Tulalip, (3) explains how all alternatives were examined using the nine criteria, including ARARs (how identified, how considered, how they apply and why selected remedy is protective), (4) why selected remedy makes technical (engineering) sense at Tulalip, and (5) briefly defines a streamlined baseline risk assessment and how it differs from a comprehensive baseline risk assessment.

EPA's use of the presumptive remedy approach at the Tulalip Landfill site is a reasonable approach to address the threats posed by the hazardous substances contained in the landfill and landfill leachate. Under the guidance document entitled "Presumptive Remedy for CERCLA Municipal Landfill Sites," OSWER Dir. No. 9355.0-49FS, September 1993 ("Presumptive Remedy Guidance") (EPA, 1993a), EPA explains why it believes that the presumptive remedy approach works for municipal landfills and can be used by EPA as a tool to streamline the decision-making process at the RI/FS stage at municipal landfill sites. In the Presumptive Remedy Guidance, EPA states that containment is the presumptive remedy for municipal landfills. The containment presumptive remedy consists of various components, which may include a landfill cap, source area ground-water control, leachate collection and treatment, landfill gas collection and treatment, and/or institutional controls to supplement engineering controls. Id. at 2. EPA's Office of General Counsel has written a memorandum which explains the relationship between EPA's presumptive remedy initiative and the requirements contained in the National Contingency Plan ("NCP"), and has determined



that the use of the presumptive remedy concept at CERCLA sites is consistent with the NCP requirements. See Memorandum from James E. Costello and George B. Wyeth entitled "Presumptive Remedies and NCP Compliance", dated June 14, 1995 (EPA, 1995a). However, in order to determine whether the Tulalip Landfill is a good "fit" for the use of a presumptive remedy, EPA Region 10 had to evaluate the site-specific conditions at Tulalip. A summary of this decision-making process is set out below.

First, Region 10 examined the reasons given in the Presumptive Remedy Guidance as to why the presumptive remedy approach works for municipal landfills and to see if that approach would work at Tulalip. The Guidance on page 2 states that:

"Section 300.430(a)(iii)(B) of the NCP contains the expectation that engineering controls, such as containment, will be used for waste that poses a relatively low long-term threat or where treatment is impracticable. The preamble to the NCP identifies municipal landfills as a type of site where treatment of the waste may be impracticable because of the size and heterogeneity of the contents (55 Fed. Reg. 8704). Waste in CERCLA landfills usually is present in large volumes and is a heterogeneous mixture of municipal waste frequently co-disposed with industrial and/or hazardous waste. Because treatment usually is impracticable, EPA generally considers containment to be the appropriate response action, or the 'presumptive remedy,' for the source areas of municipal landfill sites."

EPA Region 10 then examined the site characterization data, and concluded that the characteristics of the Tulalip Landfill were substantially similar to those at landfill sites where the use of the presumptive remedy has been deemed appropriate by EPA. See "Application of Presumptive Remedy at Tulalip Landfill" memorandum from E. McKenna, Assistant Regional Counsel, EPA Region 10, to the Tulalip Landfill File (August 4, 1995), (McKenna, 1995) located in the AR for the Tulalip Landfill Site. The Tulalip Landfill covers a large area of approximately 146 acres in Ebey Island on the Tulalip Indian Reservation. Between 1964 and 1979,



approximately three to four million tons of mixed commercial and industrial waste was deposited in the landfill. Surveys show the waste is relatively evenly distributed at an average depth of 17 feet over the 147 acre landfill, with the depth of waste in the barge canals averaging approximately 30 feet. There were no records kept at the landfill regarding the exact location or exact types of wastes deposited in the landfill. Thus, it is impossible to determine specific "hot spot" areas of contamination associated with the landfill contents. Hazardous substances found in surface soils at the Site exceeded comparison numbers in one or more samples at eight of the nine leachate soil grid locations. At six of the leachate soil grid locations, subsurface soil samples were collected. Hazardous substances found in these subsurface soils exceeded comparison numbers in five of the six subsurface soil samples. Hazardous substances detected in leachate exhibited at least one exceedance of the Washington State Marine Chronic Criteria ("MCC") in most of the eleven leachate seeps that were tested. Groundwater under the landfill is contaminated at levels exceeding Washington State Water Quality Standards ("WQS") (HLA, 1995; Weston, 1995b). Thus, it is clear that the Tulalip Landfill is a heterogeneous source of hazardous substances at levels exceeding comparison numbers, and that these hazardous substances appear to be randomly distributed throughout the landfill. As such, Region 10 determined that the Tulalip Landfill was substantially similar to other landfills where EPA has applied the presumptive remedy concept, and that the Tulalip Landfill was indeed a good "fit" within the Presumptive Remedy Guidance guidelines.

The NCP remedy selection process involves several steps, including: (1) characterizing the risks presented by a site, (2) screening technologies for possible remediation, and (3) performing a detailed analysis of those technologies that appear most promising. The screening step is based on three criteria (effectiveness, implementability, and cost), and is designed to exclude those technologies which are clearly inferior. The identification of presumptive remedies serves, in effect, to carry out the screening step in a generic manner. Thus, the presumptive remedy for municipal landfills identifies containment as the presumptive remedy, and it provides components of the containment remedy (e.g., a cap, leachate collection) for EPA to then analyze on a site-specific basis using the nine NCP remedy selection criteria in order to develop remedial alternatives for the site. To that



end, EPA Region 10 used the presumptive remedy of containment (and its components), along with alternatives suggested by other parties, to develop and analyze remedial alternatives at the Tulalip Landfill Site.

As part of this analysis of the Tulalip Landfill, Region 10 then determined that the source area of the Tulalip Landfill was an appropriate candidate for the use of a streamlined risk assessment. The preamble to the NCP states that risk assessments "...are site-specific and therefore may vary in the extent to which qualitative analyses are utilized, depending upon the complexity and particular circumstances of the site, as well as the availability of pertinent ARARs and other criteria, advisories, or guidance." See 55 Fed. Reg. at 8709.

EPA prepared a streamlined baseline risk assessment (Streamlined Risk Assessment) to facilitate evaluation of the need for potential early actions necessary to address contaminant migration from the Tulalip Landfill. Preparation of a streamlined risk assessment, as opposed to a comprehensive baseline risk assessment, is considered appropriate when addressing the potential risks associated with landfills because options for remedial action at landfill site source areas are traditionally limited to methods of containment. A streamlined risk assessment is a qualitative evaluation, based on comparison of site-related contaminant concentrations to available standards or risk-based chemical concentrations. The purpose of this type of evaluation is to assess the frequency and magnitude of exceedances of these comparison numbers and to use this information to assist in evaluating the need, or lack of need, for early action.

A comprehensive baseline risk assessment provides a quantitative evaluation of potential risk due to all chemicals in all media of concern considering site-specific exposure assumptions and a detailed evaluation of chemical concentrations. The Tulalip streamlined risk assessment is a qualitative evaluation of the frequency and magnitude of exceedance of comparison numbers considered to be protective of human health and the environment, based on standard exposure assumptions, and a qualitative evaluation of potential risks.

EPA has developed a fact sheet containing guidance for preparing streamlined risk assessments (OSWER Directive



No. 9355.3-11FS, September, 1990) (EPA, 1990a). According to this guidance, a simple comparison of site-related chemical concentrations to available comparison numbers is sufficient to warrant remedial action. EPA went beyond this requirement in preparation of the streamlined risk assessment for the Tulalip Landfill by providing a critical evaluation of the relevance of available standards and by incorporating a comparison of site-related concentrations to regionally-available background concentrations. This was done to provide a more accurate evaluation of the need for early action.

EPA's Presumptive Remedy Guidance on page 5 states that:

"[a]s a matter of policy, for the source area of municipal landfills, a quantitative risk assessment that considers all chemicals, their potential additive effects, etc., is not necessary to establish a basis for action if ground-water data are available to demonstrate that contaminants clearly exceed established standards or if other conditions exist that provide a clear justification for action."

\* \* \* \*

"Finally, a quantitative risk assessment is not required to determine clean-up levels because the type of cap will be determined by closure ARARs, and ground-water that is extracted as a component of the presumptive remedy will be required to meet discharge limits, or other standards for its disposal."

At the Tulalip Landfill, the Region decided that a streamlined risk assessment was appropriate because during the scoping process, EPA and the Respondents agreed that the best way to structure the RI/FS was to adopt the presumptive remedy approach for the source area of the landfill. Under EPA's Presumptive Remedy Guidance, EPA can streamline the risk assessment process for solid waste landfills in cases where the presumptive remedy approach is appropriate. In the RI/FS workplan (which is part of the RI/FS AOC), the Tulalip Landfill was deemed appropriate for remedial action because concentrations of contamination at the landfill exceeded federal AWQC.



In contrast to all of the sites referenced by the commentor, the Tulalip Landfill is an appropriate candidate for the use of the presumptive remedy for municipal landfills. According to an EPA memorandum from James Costello and George Wyeth of EPA's Office of General Counsel entitled "Presumptive Remedies and NCP Compliance," June 14, 1995 (EPA, 1995a), "[t]he use of presumptive remedies follows the NCP remedy selection process because the identification of presumptive remedies serves, in effect, to carry out the screening and detailed analysis steps in a generic manner that minimizes the need to perform those steps at a site-specific level." Id. at 3.

Containment is the presumptive remedy which was found to be most commonly suited for municipal landfills because these landfills, as well the Tulalip Landfill<sup>1</sup>, share the following characteristics: (1) large volume and heterogeneity of waste which make treatment impracticable; (2) limited number of alternatives for controlling releases; (3) similar potential threats to human health and the environment resulting from leachate generation, soil contamination, landfill contents, landfill gases, and contamination of groundwater, surface water, sediments and adjacent wetlands; and (4) the nature of waste deposition. See generally "Presumptive Remedy for CERCLA Municipal Landfill Sites," OSWER Dir. No. 9355.0-49FS, September 1993 ("Presumptive Remedy Guidance"). Because the Tulalip Landfill shares these characteristics with municipal landfills and EPA is unaware of any technical reasons for not applying the municipal landfill presumptive remedy guidance, EPA has concluded that the presumptive remedy approach is appropriate for the Tulalip Landfill.

Pursuant to EPA's Presumptive Remedy Guidance, containment remedies usually include installing a low permeability cover to keep rain water from filtering down through the wastes in the landfill. Containment may also include some form of leachate collection and treatment, some form of landfill gas collection, or some form of groundwater control. The preferred remedial alternative as set forth in the Proposed Plan for the Tulalip Landfill is installation of a low permeability cover over the waste. This alternative would be expected to be effective in minimizing the

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<sup>1</sup> While EPA considers the Tulalip Landfill to be a solid waste landfill but not a municipal landfill, the Agency believes that using the municipal landfill presumptive remedy guidance at the Tulalip Landfill is appropriate.



migration of contaminated groundwater from the source area. Since the FS shows that the low permeability cap will minimize the generation of leachate by virtually eliminating the movement of contaminated groundwater to surface water, the Proposed Plan recommends taking no further action to remediate groundwater.

The Presumptive Remedy Guidance recognizes that almost every municipal landfill site has some characteristics that may require additional study. For example, such characteristics may include leachate discharge to a wetland or significant water run-off caused by drainage problems, which will require more comprehensive characterization and a more comprehensive risk assessment to determine what, if any, additional remedial action is necessary. At the Tulalip Landfill, EPA is expected to complete a comprehensive baseline risk assessment in the summer of 1996. This comprehensive baseline risk assessment will examine the leachate discharges to the sensitive, ecologically valuable wetlands that surround the Landfill and to the sloughs adjacent to the Landfill. To that end, the FS for this site is being conducted in two parts: one for the containment alternatives, and one for the off-source alternatives. This analysis of the wetlands will not require a modification to this interim action because any impacts that may be occurring or have occurred to these wetlands can be addressed separate and apart from this interim action, and this interim action is needed to control the overall contaminant loading of the wetlands and sloughs that is presently occurring.

Under the source area FS, the Respondents' contractor, with Region 10 input, developed and analyzed remedial alternatives, using the nine NCP remedy selection criteria. As part of this process, the FS identified potential applicable or relevant and appropriate requirements ("ARARs") from federal and state environmental laws. Section 121 of CERCLA requires that a remedial action attain all standards specified in the ARARs identified for a given site, or a justification must be provided in the ROD for waiving the requirement to attain the ARAR. In addition, compliance with ARARs is one of the two threshold NCP remedy selection criteria, the other being protectiveness of human health and the environment.

At the Tulalip Landfill site, Region 10 considered all federal, tribal and state ARARs when it examined the various remedial alternatives and chose Alternative 4c as the selected remedy. EPA's selection of alternative



4c as the preferred alternative is justified, as alternative 4c meets all ARARs identified for the Tulalip Landfill and is protective of human health and the environment. For example, EPA identified the state of Washington landfill closure requirements contained in the Minimal Functional Standards ("MFS") in WAC 173-304 as an ARAR for the source area of the landfill. The state's MFS for closure were determined to be relevant and appropriate requirements because those MFS govern closure of municipal solid waste landfills and are more stringent than the federal solid waste landfill closure requirements codified at 40 C.F.R. § 258.60. Since Region 10 had decided that the Tulalip Landfill was substantially similar to a municipal solid waste landfill, the closure MFS contained in WAC 173-304 were deemed to be relevant and appropriate for the Tulalip Landfill. These MFS for landfill closure are protective of human health and the environment as they are designed to prevent infiltration of precipitation into the landfill which thereby minimizes the generation of landfill leachate containing hazardous substances. Since minimization of landfill leachate at the Tulalip Landfill is one of the primary remedial action objectives in this interim action, the MFS for landfill closure are a necessary requirement which are met by the selected alternative, 4c. See Section 11.2 of the ROD for a more detailed discussion and analysis of the ARARs for this site.

In addition, the selected remedy also makes engineering and environmental sense. Of all of the alternatives considered by EPA, a geosynthetic cover with passive drainage is the least expensive containment alternative that will effectively stem the generation and flow of contaminated leachate into the surface waters surrounding the landfill. This containment remedy relies on a "passive" design that does not require pumps or outside power to control surface water drainage. A low permeability cover is implementable as a well-known technology, and is expected to be effective in the long-term, with established means to monitor and maintain the cover. The selected remedy will reliably achieve the remedial action objectives of reducing risks without the need for establishing elaborate contingency measures to plan for the possible failure of less certain measures. The cover will also allow for future use of the Site, with certain institutional controls required to protect the integrity of the cover. In addition, because the selected remedy is expected to virtually eliminate



migration of leachate into the deeper Zone 2 aquifer, further remediation of Zone 2 groundwater will not be necessary after implementation of this selected interim remedy.

## 1.2 ORGANIZATION OF THE RESPONSIVENESS SUMMARY

EPA received a large number of comments from the AOC Respondents regarding the Proposed Plan for Interim Remedial Action at the Tulalip Landfill in Marysville, Washington. EPA has summarized all comments in detail and presented a response to each comment.<sup>2</sup> EPA has attempted to summarize the comments as accurately as possible. EPA decided to present all comments in detail to ensure the Agency's response is complete; consequently, the Responsiveness Summary is similar to the comments in its voluminous and detailed nature.

Comments were organized into categories for inclusion in the Responsiveness Summary. The categories are listed in the "Table of Contents" on page D-1 of this Responsiveness Summary. The organizational flow of the Summary by category begins with legal and regulatory policy comments, and then moves into a presentation of the more technical comments. Within each category, the Agency organized comments by various subtopics, or by addressing the more overarching comments for that category first and then proceeding to the more detailed comments for that category.

## 2.0 GENERAL LEGAL/POLICY ISSUES

- 2.1 **Comment:** "B.1. CERCLA and the NCP require the completion of a baseline risk assessment prior to the development and evaluation of remedial alternatives and the selection of any remedial action at the site." [1]  
[2] [3]

- 2.1.1 **Additional Comments under Comment B.1.:** The commentor also states that CERCLA "limits EPA's response action authority to circumstances where there is an imminent and substantial danger to public health, welfare, or the environment due to actual or threatened releases from a site." The commentor goes on to say that "any response measures undertaken by EPA, including the

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<sup>2</sup> EPA has assigned each commentor a number. A bracketed number appears after each comment that identifies the commentor(s). The list of commentors and their identifying number is located in the "List of Commentors" on page D-2 of this Responsiveness Summary.



selection of appropriate remedial action, must be determined to be necessary, and also consistent with the National Contingency Plan ("NCP")." Finally, the commentor concludes that "unless site risks have been properly evaluated and established, EPA has no authority to take response action itself or to order others to respond to an actual or threatened release."

**Response:** The commentor is incorrect in stating that EPA may only respond in circumstances presenting an imminent and substantial danger. Section 104(a)(1) of CERCLA authorizes a response action whenever "(A) any hazardous substance is released or there is a substantial threat of such release into the environment, or (B) there is a release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare[.]" (emphasis added) 42 U.S.C. § 9604(a)(1). In this case, the release of many different hazardous substances into the environment has been documented in the RI/FS that is in the AR. For example, data in the RI/FS shows that there are 1367 exceedances of comparison numbers. Because there are documented releases of hazardous substances on the Site, EPA may undertake a response action at the Site regardless of whether those releases pose an imminent and substantial danger to the public health or welfare. However, these releases of hazardous substances may present an imminent and substantial danger to human health and the environment. See Section 6.3 of the Tulalip Landfill Interim Action Record of Decision ("interim (action) ROD"), which states that "[c]omparison of the site measured chemical concentrations to the human health risk-based and ecological effects-based standards and criteria established under other environmental laws, and risk-based concentrations reveals potential risks to humans and the environment. Based on the RI/FS and findings in the risk assessment, EPA finds that actual or threatened releases of hazardous substances from the Site, if not addressed by the selected alternative or one of the other active measures considered, may present an imminent and substantial endangerment to public health, welfare, or the environment."

Section 121 of CERCLA, 42 U.S.C. § 9621, governs cleanup standards and selection of remedial actions. Section 121(a) states in part that:

"The President shall select appropriate remedial actions determined to be necessary to be carried out under section 9604 of this



title or secured under section 9606 of this title which are in accordance with this section and, to the extent practicable, the national contingency plan, and which provide for cost-effective response."

As is demonstrated in the AR, and as explained in this responsiveness summary, EPA has fully complied with its statutory requirements. The commentor mistakenly concludes that site risks must be "evaluated and established" through a baseline risk assessment before EPA can take a response action itself or order others to respond to an actual or threatened release. As discussed above, the only requirement for EPA to take a response action is if there is a release or threat of a release of a hazardous substance. And as will be explained below, EPA has fully complied with the requirements of the NCP by selecting a remedial alternative based on a completed streamlined baseline risk assessment prior to the completion of a comprehensive baseline risk assessment. See, also, Response to Comment 2.1.2, below.

2.1.2

**Additional Comment under B.1.:** The commentor also states that the "NCP requires EPA or potentially responsible parties, as part of the Remedial Investigation process and prior to any remedy selection, to conduct a baseline risk assessment that characterizes the nature and extent of threats to human health and the environment." [8] [17] [18]

**Response:** EPA has completed a streamlined baseline risk assessment, entitled the "Final Tulalip Landfill Risk Assessment for Interim Remedial Action," August 1995, (EPA, 1995d), (the "Streamlined Risk Assessment"), which is sufficient to support selection of an interim containment remedy at this Site. The NCP does not require a more comprehensive baseline risk assessment than the one EPA has completed in order to take the type of action that EPA is selecting for the Source Area of the Site. The NCP requires a balancing process to be employed in deciding whether early action is appropriate at a site. This balancing process involves weighing the need for prompt, early actions against the need for definitive site characterization. This balancing process is specifically linked to the RI/FS, including the risk assessment, at 40 C.F.R. § 300.430(a)(2):

"Developing and conducting an RI/FS generally includes the following activities: project scoping, data



collection, risk assessment, treatability studies, and analysis of alternatives. The scope and timing of these activities should be tailored to the nature and complexity of the problem and the response alternatives being considered." (Emphasis added).

The preamble to the 1990 revisions to the NCP states:

"EPA expects to take early action at sites where appropriate, and to remediate sites in phases using operable units as early actions to eliminate, reduce or control the hazards posed by a site or to expedite the completion of total site cleanup. In deciding whether to initiate early actions, EPA must balance the desire to definitively characterize site risks and analyze alternative remedial approaches for addressing those threats in great detail with the desire to implement protective measures quickly. Consistent with today's management principles, EPA intends to perform this balancing with a bias for initiating response actions necessary or appropriate to eliminate, reduce, or control hazards posed by a site as early as possible" (Emphasis added). 55 Federal Register 8704 (March 8, 1990).

The Streamlined Risk Assessment reflects the nature and complexity of the problem and the response alternatives considered. EPA balanced the need for action based on its evaluation of existing data and the nature of the Site against the need to develop more data as the basis of a more comprehensive risk assessment. EPA has determined that the selected containment remedy is appropriate given the risks known to exist at the Site as evaluated in the Streamlined Risk Assessment.

The commentor asserts that the Streamlined Risk Assessment does not provide the level of detail to satisfy the fundamental purpose of a baseline risk assessment. The preamble to the NCP and guidance documents provide more detailed information on how EPA suggests risk assessments may be conducted at Superfund sites of varying scope and complexity. A close examination of these sources shows that the Streamlined Risk Assessment is consistent with EPA's policy for



sites of similar scope and complexity to the Tulalip Landfill Site and, does in fact, meet minimum requirements for risk assessment.

"To implement an early action under the remedial authority, an operable unit for which an interim action is appropriate is identified. Data sufficient to support the interim action decision is extracted from the ongoing RI/FS that is underway for the site or final operable unit and an appropriate set of alternatives is evaluated...A completed baseline risk assessment generally will not be available or necessary to justify interim action.

\* \* \*

"Qualitative risk information should be organized that demonstrates that the action is necessary to stabilize the site, prevent further degradation, or achieve significant risk reduction quickly. See 55 Federal Register 8704 (March 8, 1990) (Emphasis added).

The Streamlined Risk Assessment provides data "sufficient to support the interim action" decision. As quoted above, the supporting data may be extracted from the "ongoing RI/FS" and an "appropriate set of alternatives" may be evaluated prior to the issuance of a completed baseline risk assessment. The NCP clearly envisioned a situation such as this where information from the ongoing RI was used to complete a risk assessment which provides the basis for remedial action to stabilize that specific area of the Site. Consistent with the NCP, EPA plans to complete a comprehensive baseline risk assessment which will be used to evaluate whether additional cleanup actions will be needed for the off-source area, after a containment action for the source area has been selected.

EPA's "Risk Assessment Guidance For Superfund, Volume 1, Human Health Evaluation Manual (Part A)," December 1989 (EPA, 1989a), further elaborates on the principle that varying levels of detail are required in risk assessments, depending on the timing of the action to be taken at a Site:

"Although risk information is fundamental to the RI/FS and to the



remedial response program in general, Superfund site experience has led EPA to balance the need for information with the need to take action at sites quickly and to streamline the remedial process. Revisions proposed to the NCP in 1988 reflect EPA program management principles intended to promote the efficiency and effectiveness of the remedial response process. Chief among these principles is a bias for action." See page 1-1.

"Baseline risk assessments are site-specific and therefore may vary in both detail and the extent to which qualitative and quantitative analyses are used, depending on the complexity and particular circumstances of the site, as well as the availability of applicable or relevant and appropriate requirements (ARARs) and other criteria, advisories, and guidance." (Emphasis added). See page 1-6.

Similarly, in "Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual," March 1989 (EPA, 1989b), EPA advises at page 10 that "[t]he nature, extent, and level of detail of the ecological assessment will be determined according to the phases of the remedial process, the specific study objectives, and the characteristics of the site and its contaminants."

- 2.1.3 **Additional Comment under B.1.:** The commentor states that paragraph 35 of the AOC requires Region 10 to provide Respondents with "two or more baseline risk assessment memoranda prior to the Respondents' initiation of the Feasibility Study Report" and to issue a baseline risk assessment report during site characterization. The commentor goes on to state that the "Administrative Record for the Site, however, confirms that no baseline risk assessment memoranda were provided to Respondents prior to initiation of the Source Area Containment ("SAC") Feasibility Study report. Moreover, Region 10 has not yet issued a baseline risk assessment report."

**Response:** Section IX of the AOC, entitled "EPA's Baseline Risk Assessment," establishes that EPA will perform the baseline risk assessment, and provides some description of how EPA will provide information to the AOC Respondents for purposes of performing the



feasibility study report. Paragraph 35 of the AOC states that EPA will provide sufficient information concerning baseline risks such that the Respondents can begin drafting the feasibility study report. EPA has prepared a streamlined baseline risk assessment for the source area of the Tulalip Landfill Site. In addition, a comprehensive baseline risk assessment for the entire site is expected to be completed in the summer of 1996. The commentor misconstrues Paragraph 35 as requiring a "baseline risk assessment" for the Source Area Containment Feasibility Study (SAC-FS). Moreover, the commentor narrowly interprets the AOC provisions for risk assessments used at this Site by failing to recognize the two-phased approach that was agreed upon by EPA and the AOC Respondents. In addition, the commentor is incorrect in stating that EPA is "required" to provide the memoranda identified in Paragraph 35.a. of the AOC before a feasibility study is completed.

Paragraph 35.a. of the AOC states that EPA will provide "sufficient information concerning the baseline risk such that the Respondents can begin drafting the feasibility study report." There is no requirement that EPA prepare a baseline risk assessment "prior to" initiation of the feasibility study, as the commentor writes. EPA provided the AOC Respondents the draft Remedial Action Objectives for the SAC-FS based on data gathered at the site and reported by the Respondents during site characterization. The demonstrated exceedances of comparison numbers showed sufficient threats existed at the site to warrant development of source area containment alternatives. Information showing the threats at the site due to exceedances of established federal and state environmental criteria, standards, and risk-based concentrations provides an adequate basis to develop and evaluate remedial alternatives to address the environmental problems by attaining those existing requirements. Therefore, EPA believes that the site data submitted by the AOC Respondents showed the need for a response action to contain the landfill wastes, and the Remedial Action Objectives (RAOs) that EPA identified provided sufficient information for the AOC Respondents to prepare the SAC-FS.

The commentor's criticism of EPA for failing to complete the "baseline risk assessment" prior to completion of the SAC-FS fails to consider the phased approach that EPA and the AOC Respondents agreed to undertake at the Site. Paragraph 27 of the AOC and the RI/FS Work Plan attached to the AOC clearly specify



that EPA and the Respondents agreed upon a two-phased approach for evaluating site conditions and possible response actions. Both EPA and the AOC Respondents recognized that the first phase was to evaluate alternatives for the presumptive remedy of containment.

In the first phase, the Respondents agreed to complete the Remedial Investigation for the entire site, and to submit a focused feasibility study for the landfill source area (referred to in Paragraph 27.g. as the "Source Area Containment Feasibility Study"). The second phase, described in Paragraph 27.h. of the AOC, involves preparation of a feasibility study called the "Site Feasibility Study" for the entire site, including areas surrounding the source area. The Site Feasibility Study required under the AOC clearly contemplates that it will be prepared after the Remedial Investigation Report had been completed and after EPA selects the source area containment remedy. Paragraph 27.h. states that the AOC Respondents shall prepare a Site Feasibility Study that "incorporates the Remedial Investigation by reference as approved by EPA, and considers the Source Area Containment Presumptive Remedy approved by EPA" (emphasis added). Therefore, the two-phase RI/FS approach to which the AOC Respondents and EPA agreed contemplates that the second phase, full Site Feasibility Study will incorporate the results of the first phase, which identified a source area containment remedy. Paragraph 27.h. of the AOC clarifies that both EPA and the Respondents recognized that EPA would choose a source area containment remedy prior to the initiation of the Site Feasibility Study. In other words, work under the AOC was designed so that EPA would prepare two risk assessments for the potential response actions at the Site: one for the source area containment remedy, and a second for the off-source area.

EPA prepared the Streamlined Risk Assessment to characterize current and potential threats to human health and the environment that may be posed by contaminants. The results from the Streamlined Risk Assessment indicate that action is appropriate to achieve significant risk reduction quickly. The comprehensive baseline risk assessment for the off-source area that EPA will prepare, and which is contemplated by Paragraph 35.b. of the AOC, will support the "Site Feasibility Study" required under Paragraph 27.h. of the AOC, which has not yet been initiated by the AOC Respondents. EPA has begun to prepare the comprehensive baseline risk assessment and will provide information from that effort when EPA



directs the AOC Respondents to develop and submit the Site Feasibility Study pursuant to the terms of the AOC.

The commentor also is incorrect in asserting that Paragraph 35 of the AOC "requires" EPA to provide the memoranda that are described. Paragraph 35.a. of the AOC states that this information "will normally be provided in the form of two or more" memoranda, stating one memorandum will "generally" include certain information. The text of Paragraph 35.a. provides only guidance as to how EPA will prepare the risk assessment, and the terms of the AOC do not mandate either the number or content of the memoranda. In fact, EPA did provide the AOC Respondents an opportunity to comment on the Interim Remedy Risk Assessment, which contains all of the types of information described in Paragraph 35.a. EPA intends generally to follow the procedures described in Paragraph 35 as it prepares the comprehensive baseline risk assessment to support the Site Feasibility Study and selection of a final remedy for the site in addition to the source area containment remedy.

2.2

**Comment:** "B.2. Region 10's Screening-Level Risk Assessment for the Tulalip Landfill is Not the Baseline Risk Assessment Required by CERCLA, the NCP and the AOC." [2] [3]

**Response:** The Streamlined Risk Assessment developed for the Source Area of the Tulalip Landfill meets all statutory and regulatory requirements, as well as the requirements set out in the RI/FS AOC (See Response to Comment Section 2.1). Neither CERCLA, the NCP, nor the general risk assessment guidances dictate a single approach for conducting a risk assessment for all types of Superfund sites. The nature of the risk assessment is dependant on the scope and complexity of the site problem to be addressed.

The risk assessment for the on-source area of the Tulalip Landfill was initially referred to as a "screening level" risk assessment. However, that term has proven to be misleading. In general, a "screening level" assessment is an evaluation of whether or not there are exceedences of "screening criteria" that have been selected for a particular site to determine if further study is warranted. A streamlined risk assessment under the presumptive remedy approach, on the other hand, compares site data to established human health and environmental criteria, standards, and risk-based concentrations in order to support EPA decision-



making regarding the need for early or interim remedial action to protect human health and the environment at a given site. Thus, in order to avoid confusion in the future, the risk assessment that was prepared for the source area of the Tulalip Landfill is called the Streamlined Risk Assessment.

In selecting the interim remedy, EPA has correctly interpreted and followed the EPA Presumptive Remedy guidance. The guidance clearly provides for selection of an interim containment action based on the results of a streamlined baseline risk assessment. The "Final Tulalip Landfill Risk Assessment for Interim Remedial Action" (the "Streamlined Risk Assessment") meets the requirements of a streamlined baseline risk assessment prescribed in EPA's presumptive remedy guidance.

The EPA guidance document entitled "Streamlining the RI/FS for CERCLA Municipal Landfill Sites ("RI/FS Streamlining Guidance", OSWER Directive No. 9355.3-11FS, December 1990), explains the basic requirements for streamlining the baseline risk assessment which will support an early decision on a presumptive remedy. Page 3 states:

"The purpose of the baseline risk assessment is to determine whether a site poses risks to human health and the environment that are significant enough to warrant remedial action. Because options for remedial action at municipal landfill sites are limited, it may be possible to streamline or limit the scope of the baseline risk assessment by:

1. Using the conceptual site model and RI-generated data, to perform a qualitative risk assessment that identifies contaminants of concern in the affected media, their concentrations, and their hazardous properties which may pose a risk through the routes of exposure."

The Streamlined Risk Assessment performed at the Tulalip Landfill fully follows this guidance. Two conceptual site models have been prepared: one for Human Health Risks (Figure 5-5 of the interim ROD), and one for Ecological Risks (Figure 5-6 of the interim ROD). The Streamlined Risk Assessment is a qualitative risk assessment that identifies contaminants of concern in the affected media (summarized in Tables 5-1, 6-1, and 6-3 of the interim ROD). The interim ROD identifies contaminant concentrations in Tables 6-2, 6-



4, and 6-5, and Figures 6-1 and 6-2. The streamlined Risk Assessment provides information on toxicity of chemicals that were found. Appendices A and B of the streamlined Risk Assessment provides information on how the standards and criteria were developed, against which the site data were compared, and why an exceedance of particular standards and criteria represents a potential threat to the ecosystem.

Page 3 of the RI/FS Streamlining Guidance states that:

- "2. Identifying all pathways that are an obvious threat to human health or the environment (see Figure 1) by comparing RI-derived contaminant concentration levels to standards that are potential chemical-specific ARARs for the action. These may include: (1) Non-zero MCLGs and MCLs for groundwater and leachate and (2) State air quality standards for landfill gases.

When potential ARARs do not exist for a specific contaminant, risk-based chemical concentrations should be used."

Potential chemical-specific ARARs, including standards and risk-based criteria, were used in the Risk Assessment. For the human health evaluation, they are listed in Table 6-1 of the interim ROD; those for the ecological evaluation are listed in Table 6-3. The potential chemical-specific ARARs, standards, and criteria were taken from a number of different sources, which are listed in the footnotes in the tables. Sample results from the Tulalip Landfill Site that exceeded these potential ARARs and criteria are summarized in Tables 6-2, 6-4, and 6-5 of the interim ROD. Tables 6-2, 6-4, and 6-5 show that Tulalip Landfill site-specific sample results indicate 1367 exceedances of potential chemical-specific ARARs, standards and risk-based criteria in various media.

Page 3 of the RI/FS Streamlining Guidance states that:

- "3. Where established standards for one or more contaminants in a given medium are clearly exceeded, the basis for taking remedial action is warranted (i.e., quantitative assessments that consider all chemicals, their potential additive effects, or additivity of multiple



exposure pathways are not necessary to initiate remedial action)."

In accordance with this guidance, EPA concludes that an interim remedial action is warranted for the following media, for which more than one exceedance is documented in the interim ROD, Tables 6-2, 6-4 & 6-5:

Medium	Number of Exceedances <sup>3</sup>	Number of Contaminants
Leachate discharging from the perimeter landfill berm	510	41
Surface soil	414	26
Zone 2 ground water <sup>4</sup>	160	16 <sup>5</sup>
Subsurface soil	113	18
Surface sediment	94	8
Surface water	26	9
Leachate seep SP-01 <sup>6</sup>	26	9
Subsurface sediment	24	3

Based on this table, it is apparent that Site data exceed comparison numbers, which include potential ARARs, standards, criteria, and risk-based chemical concentrations, for at least 1 contaminant for all of

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<sup>3</sup> Includes exceedences of both total metals and filtered metals samples.

<sup>4</sup> These results for Zone 2 ground water do not factor in dilution due to tidal mixing between ground water wells and the ground water/surface water interface.

<sup>5</sup> Groundwater modeling results indicate that some of these contaminants are unlikely to meet Ambient Water Quality Criteria standards at the ground water/slough interface after taking into account potential dilution between the wells and the ground water/slough interface.

<sup>6</sup> Leachate seep SP-01 is unique among the leachate seeps sampled during the RI because it is located on the landfill surface.



the above media.<sup>7</sup> In fact, for most media there are a significant number of exceedences. Therefore, EPA has concluded that the basis for taking early, interim remedial action is satisfied. In accordance with the RI/FS Streamlining Guidance, the streamlined Risk Assessment is not required to provide "quantitative assessments that consider all chemicals, their potential additive effects, or additivity of multiple exposure pathways ... to initiate remedial action." See OSWER Dir. No. 9355-11FS, at p. 3. The RI/FS Streamlining Guidance expressly states that quantitative assessments are not necessary to justify remedial action where there is a clear exceedance of established standards.

As shown in the table above, the streamlined Risk Assessment clearly documents numerous instances where site-specific data exceed potential chemical-specific ARARs and standards, therefore EPA concludes that a more thorough risk assessment is not necessary prior to initiating an interim remedial action. The RI/FS Streamlining Guidance goes on to state:

"This streamlined approach may facilitate early action on the most obvious landfill problems---groundwater and leachate, landfill gas, and the landfill contents---while analysis continues on other problems such as affected wetlands and stream sediments." Id.

This is precisely the approach that EPA has taken at Tulalip Landfill. The RI/FS AOC and Work Plan have been structured to enable early action on the source area of the landfill, while analysis of other problems continues. EPA and the Respondents are currently proceeding on a separate track from this interim remedial action to continue evaluating alternatives for cleaning up the off-source wetlands and tidal channels in an off-source Feasibility Study, and to produce a comprehensive baseline risk assessment for the off-source areas of the landfill.

EPA has based its decision to proceed with an interim containment remedy based on numerous exceedences of risk-based criteria in various media associated with

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<sup>7</sup> There were also exceedences of Zone 1 ground water, but Zone 1 ground water was not included in the above list because exposure to Zone 1 ground water would most likely occur through exposure to either the leachate seeps or Zone 2 ground water entering the sloughs. The leachate seep and Zone 2 ground water pathways are already captured in the above list.



the landfill, including leachate, groundwater, pooled surface water on the landfill, and off-source sediments and soils. EPA has begun work on the site comprehensive baseline risk assessment, in accordance with the presumptive remedy guidance, which may be completed in the summer of 1996.

Presumptive remedy guidance makes no mention of the need to collect surface data, although it recommends the collection of many other types of data. A recent EPA guidance document, called "Presumptive Remedies: CERCLA Landfill Caps RI/FS Data Collection Guide" (EPA/540/F-95/009, August 1995), describes the types of data that should be gathered during the RI/FS. Although this guidance was not available during the scoping of the Tulalip RI/FS process, the RI/FS Work Plan is generally consistent with this guidance:

"Since containment is the presumptive remedy for MSWLFs (Municipal Solid Waste Landfills), the Remedial Project Manager (RPM) can begin making arrangements to collect landfill cap design data as soon as a basis for remedial action is established...." Id. at 1.

On page 5-1 of the RI/FS Work Plan for the Tulalip Landfill Site (April 1993), EPA established that a basis for remedial action existed based on site-specific data available at that time. Page 5-1 states:

"The EPA has determined [Conducting Remedial Investigation/Feasibility Studies for CERCLA Municipal Landfill Sites (EPA/S40/P-91/001), February 1991] that remedial action for source control at the Tulalip Landfill is warranted because concentrations of several contaminants in surface water at the landfill (E&E 1988) exceed the established standards of ambient water quality criteria (see Section 3.1.2)."

EPA developed the RI/FS Work Plan, Field Sampling Plan, and Quality Assurance Project Plan in accordance with presumptive remedy guidance, and with considerable input from the Respondents prior to finalizing these documents. The Respondents, in signing the AOC, agreed to follow the presumptive remedy approach for the RI/FS, and agreed to collect site data in accordance with the Work Plans they helped create. In a January



11, 1993, letter,<sup>8</sup> one of the Respondents transmitted comments to EPA regarding the contents of a draft version of the RI/FS Work Plan:

"Although we support the general concept of a presumptive remedy, in this case it is advisable to confirm environmental conditions on and in the vicinity of the landfill prior to remedy selection, and to base remedy selection on performance standards."

This statement indicates the Respondents supported the presumptive remedy approach for structuring the RI/FS, and that in their view, site data must be gathered and evaluated prior to selection of a remedy. Since the time that statement was written, the RI has been completed. Based on EPA's evaluation of the RI data, it is clear that environmental conditions on and in the vicinity of the landfill warrant remedial action.

The Respondents initiated a formal dispute process over additional work they wanted to perform after they had submitted the Source Area Containment Feasibility Study. EPA determined that the additional work the Respondents had requested was unnecessary and would not provide significant additional information for a decision on an interim containment remedy, and that the Respondents' request to perform this additional work was untimely. See, also, Response to Comment 2.9.1. EPA was not willing to delay site cleanup to allow for collection of this unnecessary data.

The Respondents' request to conduct additional sampling for the purpose of evaluating any chemical contamination on the landfill surface directly is addressed by EPA guidance on presumptive remedies. Page 5 of the "Presumptive Remedy for CERCLA Municipal Landfill Sites" states:

"Streamlining the risk assessment of the source area eliminates the need for sampling and analysis to support the calculation of current or potential future risk associated with direct contact."

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<sup>8</sup> Letter dated January 11, 1993, from Leonard H. Sorrin of Bogle & Gates, and Jeffrey S. Myers of Short, Cressman & Burgess, to William Glasser, Remedial Project Manager, U.S. Environmental Protection Agency, Re: Comments of the Seattle Disposal Company on the Draft Work Plan for the Tulalip Landfill Superfund Site.



The EPA Region 10 Deputy Regional Administrator's determination on the Respondents' request to conduct such sampling was wholly consistent with this guidance.

The Respondents' request for additional work to install Zone 2 wells near the Zone 2/slough interface contradicts their arguments during the Work Plan scoping process. In a draft version of the Work Plan, EPA initially planned to install the Zone 2 wells near the Zone 2/slough interface. However, as part of written comments on a draft version of the Work Plan, the Respondents commented to EPA that the wells should be moved back to the landfill perimeter berm, a less expensive approach. In response, EPA agreed to allow installing the wells on the landfill berm. The final Work Plan stated that the wells would be installed on the berm, and during the RI/FS the Respondents installed the wells on the berm and began sampling them. They found exceedances of AWQC in the perimeter berm wells, and they employed a groundwater modeling approach to estimate what the concentrations would be at the groundwater/slough interface in order to evaluate whether State Ambient Water Quality Criteria (AWQC) standards were likely to be exceeded at the point where groundwater enters the slough.

The Respondents' modeling results indicated that, taking into account the dilution of contaminants that would be expected to occur between the perimeter wells and the Zone 2/slough interface, exceedances of AWQC were still likely at the Zone 2/slough interface for some contaminants. After the SAC RI and FS reports had been submitted, the Respondents initiated a formal dispute process under the AOC and argued that EPA should agree to the installation of additional wells at the Zone 2/slough interface, which they had argued against during scoping and prevailed. EPA believes that the approach used in the RI/FS at the urging of the Respondents, which included perimeter berm wells in conjunction with groundwater modeling, is a sound and reasonable technical basis for the purposes of EPA's decision regarding an interim containment remedial action.

2.3        **Comment:** "B.3. Region 10's Screening-Level Risk Assessment Is Insufficient and Untimely For Purposes of On-Source Remedy Determinations." [3]

2.3.1      **Additional Comments under B.3.:** The commentor also states that the "screening level risk assessment" is insufficient in that it failed to use site-specific data to satisfy the purposes of a baseline risk



assessment. Additionally, the commentor states that the risk assessment produced by EPA for the Site is untimely in that it was issued after the SAC Feasibility Report process was completed.

**Response:** The comments regarding the sufficiency of the level of detail in the risk assessment and the appropriateness of the timing of the risk assessment are addressed above in the Response to Comment Section 2.1. In addition to the explanation provided in the Response to Comment Section 2.1 regarding the level of detail in the risk assessment, it is EPA's position that the Tulalip Landfill is an appropriate site for a streamlined risk assessment because sampling which had been conducted at the site during the RI indicated exceedances of water quality standards, criteria, and risk-based concentrations. See EPA OSWER Directive No. 9355.0-49FS, "Presumptive Remedy for CERCLA Municipal Landfill Sites," (EPA, 1993a), (Presumptive Remedy Guidance), which states that a site generally will be eligible for a streamlined risk assessment evaluation if groundwater contaminant concentrations clearly exceed chemical-specific standards or EPA's accepted level of risk, or other conditions exist that provide a clear justification for action. If no conditions are shown to exist that provide clear justification for action, a quantitative risk assessment that addresses all exposure pathways will be necessary to determine whether action is needed. See OSWER Dir. No. 9355.0-49FS, p. 5., (EPA, 1993a).

Streamlined risk evaluation is appropriate at the Tulalip Landfill because site investigation efforts, including sampling done from 1993-4 by the Respondents as part of the RI, indicate that landfill leachate leaving the Site exceeds comparison numbers that are considered protective of human health and the environment, including water quality standards and criteria, and risk-based concentrations for pesticides such as DDT and aldrin, polychlorinated biphenyls (PCBs), and heavy metals and other contaminants including chromium, copper, lead, mercury, nickel, zinc, ammonia, and heptachlor. The RI documents the presence of hazardous substances contaminating soils, sediments, surface water, and groundwater at the Site.

Hazardous substances found in surface soils at the Site exceeded comparison numbers in one or more samples at eight of the nine leachate soil grid locations. At six of the leachate soil grid locations, subsurface soil samples were collected. Hazardous substances found in these subsurface soils exceeded comparison numbers in



five of the six subsurface soil samples. Hazardous substances found in leachate exceeded comparison numbers at least once in most of the eleven seeps that were tested. Chemicals detected in Zone 1 groundwater (which is generally located within the refuse layer of the landfill) exceeding MCCs included the metals copper, lead, nickel, and zinc, as well as ammonia, cyanide, and the pesticide heptachlor epoxide. The studies found that Zone 2 groundwater (which is generally located below the refuse layer, except for the former barge canals) was contaminated at levels exceeding MCCs for the metals copper, lead, and nickel, as well as cyanide and ammonia.

EPA's Presumptive Remedy Guidance recognizes that almost every municipal landfill site has some characteristics that may require additional study. See OSWER Dir. No. 9355.0-49FS, p. 5. For example, such characteristics may include leachate discharge to a wetland or significant water run-off caused by drainage problems. These migration pathways, as well as groundwater contamination that has migrated away from the source, generally will require characterization and a more comprehensive risk assessment to determine whether action is warranted beyond the source area and, if so, the type of action that is appropriate. At the Tulalip Landfill, leachate from the landfill flows directly into sensitive, ecologically valuable wetlands that surround the Site, and into sloughs connected with the Snohomish River and Puget Sound. As a result, and consistent with EPA's Presumptive Remedy Guidance, the FS at the Site is being conducted in two phases in order to address first the containment alternatives, and secondly, the off-source alternatives.

- 2.3.2 **Additional Comments under Comment B.3.:** The commentor concludes this comment section by reiterating that the Risk Assessment is inadequate. The commentor cites reasons for the apparent inadequacy, which are as follows: (1) the Risk Assessment relies on overly conservative criteria; (2) ignores extensive site data that demonstrates risks are negligible; (3) fails to consider background concentrations; (4) "screening level criteria" were not applied at appropriate locations/media; (5) use of 5 dated and nonrepresentative 1988 ponded water samples to characterize surface of a large surface; (6) denied respondents requests for additional sampling; and (7) the quality of data is questionable.



**Response:** To avoid extensive duplication, the reader is referred to the following specific responses. For: (1) the Risk Assessment relies on overly conservative criteria, see Responses to Comments 11.9 and 11.10; (2) ignores extensive site data that demonstrates risks are negligible, see Responses to Comments 2.10.2 and 11.6; (3) fails to consider background concentrations, see Responses to Comments 11.111 - 11.115; (4) "screening level criteria" were not applied at appropriate locations/media, see Responses to Comments 11.116 - 11.117; (5) use of 5 dated and nonrepresentative 1988 ponded water samples to characterize surface of a large surface, see Responses to Comments 2.9.2, 2.9.3 and 11.7; (6) denied Respondents requests for additional sampling, see Responses to Comments 2.9, 2.9.1, and 2.10.3; and (7) the quality of data is questionable, see Responses to Comments 2.9.2 and 10.1 - 10.4.

2.4 **Comment:** "B.4. EPA's Failure to Complete a Baseline Risk Assessment For the Tulalip Landfill Is Inconsistent With Its Approach at Other CERCLA Sites" [3]

2.4.1 **Additional Comments Under B.4.:** The commentor identifies other landfills in Washington and in other states that the commentor believes are similar to the Tulalip Landfill. The commentor states that EPA properly utilized a baseline risk assessment process at those sites to determine the need for remedial action. The commentor concludes by saying that EPA acted inappropriately at Tulalip by failing to conduct a baseline risk assessment prior to selecting a remedy. The following sites were identified by the commentor: Whidbey Island Naval Air Station Operable Unit (OU)-2, Area 2/3 and OU-4, Area 48/49, the Hamilton Island Landfill, and the Everett Landfill (the previous three sites are located in Washington state), the Old City of York Landfill in Pennsylvania, the Suffolk City Landfill in Virginia, the Broward County Landfill in Florida and the Ordot Disposal Site in Guam.

**Response:** As explained in the Response to Comment 2.1, above, EPA is not required by statute, regulation, or guidance to complete a comprehensive baseline risk assessment prior to selecting and implementing an interim remedy. The presumptive remedy process permits EPA to conduct a streamlined baseline risk assessment for the source area at the Tulalip Site. This approach is also compliant with NCP and CERCLA requirements. In addition, EPA is preparing a comprehensive baseline risk assessment for the entire Tulalip Landfill site, which is expected to be completed in the summer of



1996. The comprehensive baseline risk assessment will evaluate the need for further action for the off-source areas of the site.

The Agency believes it is inappropriate and misleading to compare sites because the facts which form the basis for remedy decisions are unique to individual sites. It is impossible to draw the conclusion that because a certain approach was taken at one site, it is appropriate to take that approach at an unrelated site. The detailed decision-making process used at these other sites in choosing a response action may not be appropriate at the Tulalip Landfill. EPA Region 10 explains and supports in this interim ROD and the Response to Comments its decision-making process, including the use of a streamlined risk assessment, at the Tulalip Landfill.

It is useful to note a fundamental difference between the sites discussed by the commentor and the Tulalip Landfill: none of the sites identified by the commentor were evaluated or remediated (including No Action determinations) pursuant to the presumptive remedy process. At some sites the lead regulatory agency (in some cases a state agency) and the potentially responsible parties entered into contractual agreements for investigative work or started investigative work before the presumptive remedy approach was developed and consequently did not use the presumptive remedy approach to structure the RI/FS and the remedy selection process at those sites.

Sites which are located outside the state of Washington may not be "similar" to the Tulalip Landfill because they are subject to and must comply with different state ARARs. Landfill sites located on military bases may have very unique characteristics with regard to the types of wastes disposed (e.g., munitions), and therefore are also not "similar" to the Tulalip Landfill.

While the commentor identifies certain of the operable units (OU-3 and OU-4) at the Whidbey Island Naval Air Station as examples, EPA notes that the commentor failed to mention the operable unit #1 at Whidbey Island. At OU #1, the final ROD called for a low permeability landfill cover which meets the requirements of the current state of Washington Minimal Functional Standards (MFS) for landfill closure.



2.5

**Comment:** "B.5. Region 10's Contention That a Screening-Level Risk Assessment Is Sufficient to Support an 'Interim Remedial Action' Costing In Excess of \$40 Million Is Inconsistent With the NCP and EPA Guidance." [3] [8]

**Response:** The commentor's statement that the selected interim alternative costs \$40 million is in error. EPA's estimated cost of the estimated interim remedy, Alternative 4c, Geosynthetic Cover with Passive Drainage, is \$25.1 million<sup>9</sup>. This cost estimate includes construction costs and operation and maintenance (O&M) costs, calculated over a 30-year time period using a 5% discount rate.<sup>10</sup> EPA notes that O&M may be required for more than 30 years.

The commentor may be confused by statements EPA made to the AOC Respondents during the course of the de minimis settlement discussions that the total site costs were estimated at \$40 million. The \$40 million figure represents the \$25.1 million cost of the interim remedy, plus EPA's past costs associated with the Tulalip Landfill site, plus costs incurred by the Respondents during the RI/FS, plus certain contingent costs.

Selection of a containment alternative such as Alternative 4c as an early/interim remedial action, is consistent with CERCLA, the NCP, and EPA guidance on presumptive remedies. Alternative 4c is considered an early remedial action because it may not be the only on-source or off-source action taken at the Site. Potential additional containment actions for the source area, if necessary, in the final ROD for the Site could include things such as a groundwater treatment system, installation of a perimeter leachate collection and treatment system, if post-cover construction monitoring shows that the cover is not adequately reducing discharges of hazardous substances from the Site.

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<sup>9</sup> The Respondents' cost estimate for this alternative, which does not account for the possibility that a landfill gas treatment system may be required, is \$22.4 million.

<sup>10</sup> EPA considers actual remedial costs to fall within +50% to -30% of the cost estimate. In general, more detailed cost estimates are developed after the ROD is issued, during detailed design stages.



2.5.1 **Additional Comment Under B.5.:** The commentor claims that Region 10 did not respond to technical comments on the draft risk assessment.

**Response:** EPA's August 4, 1995, letter to the Respondents, which transmitted the final streamlined risk assessment for the Interim Remedial Action, states, in part:

"Please find enclosed the Final Risk Assessment for Interim Remedial Action...The draft was revised, in part to address those of your comments that EPA agrees are appropriately addressed in this document. EPA intends to provide written responses to your other comments (those with which we did not agree are appropriately addressed in this document) in the Responsiveness Summary that EPA will prepare at the conclusion of the public comment period for the Proposed Plan for Interim Remedial Action."

In accordance with the August 4th letter, this Responsiveness Summary addresses all of the Respondents' comments on the draft Streamlined Risk Assessment for interim remedial action. See, also, Response to Comments 11.6, 11.18 and 11.88.

2.5.2 **Additional Comment Under B.5.:** The commentor asserts that "the Presumptive Remedy Guidance limits use of a streamlined risk evaluation to those circumstances where a public health risk is manifest because chemical-specific groundwater standards are clearly exceeded."

**Response:** EPA has explained in Response to Comment Section 2.1, above, why the preparation of a comprehensive baseline risk assessment at this Site in support of this interim remedial action is neither necessary nor appropriate. Further, EPA's Presumptive Remedy Guidance identifies two situations where a comprehensive baseline risk evaluation is not necessary:

"As a matter of policy, for the source area of municipal landfills, a quantitative risk assessment that considers all chemicals, their potential additive effects, etc., is not necessary to establish a basis for action if groundwater data are available to demonstrate that contaminants clearly exceed established standards or if other conditions



exist that provide a clear justification for action." (emphasis in original) See EPA's "Presumptive Remedy for CERCLA Municipal Landfill Sites", OSWER Directive No. 9355.0-49FS, September 1993, p. 5, (EPA, 1993a).

The Tulalip Landfill site satisfies both of these situations. This guidance recommends only that exceedances of "groundwater standards" be demonstrated, or that "other conditions exist" which justify action, in order to implement a streamlined or qualitative risk assessment on the source area of a landfill rather than a quantitative, or comprehensive risk assessment. Contrary to the commentor's assertion, EPA's guidance does not limit the use of streamlined risk assessments to those situations where health-based drinking water standards are exceeded. The use of a streamlined risk assessment is, consistent with this guidance, particularly appropriate at the Tulalip Landfill because groundwater which has been shown to be contaminated at levels that exceed Washington State ambient water quality standards discharges directly from the landfill into surface waters. EPA disagrees with the commentor's narrow interpretation of the Presumptive Remedy Guidance that the term "standards" refers only to groundwater standards.

To further emphasize the appropriateness of using a streamlined risk assessment to implement an early remedial action, EPA notes that the Respondents have recognized that conditions at the Tulalip Landfill warranted an expedited approach for implementation of response action. The commentor, on behalf of his clients Josie Razore and John Banchemo, sought an emergency preliminary injunction from the U.S. Court of Appeals for the Ninth Circuit, requesting that the Court take immediate measures to stop the generation of the leachate from the landfill. The PRPs cited expert testimony that leachate is discharging from the Tulalip Landfill at levels exceeding water quality criteria such that water quality in the surface waters adjacent to the landfill will "fall below the level that will sustain fish and other aquatic life in the waters surrounding the Landfill." See July 26, 1995, letter from Richard McAllister, Assistant Regional Counsel, EPA Region 10, to Wm. Roger Truitt of Piper & Marbury, (McAllister, 1995) (this letter can be found in the AR for the Tulalip Landfill Site).

EPA has proceeded with a streamlined risk evaluation to support selection of an early/interim remedy for the



landfill source area consistent with EPA's Presumptive Remedy Guidance.

EPA is currently developing a comprehensive baseline risk assessment (comprehensive baseline risk assessment) for the Site. EPA expects the comprehensive baseline risk assessment will be completed in the summer of 1996. The purpose of the comprehensive baseline risk assessment will be to evaluate whether additional cleanup measures should be undertaken in the off-source areas to address contamination that has migrated to these areas from the landfill. A comprehensive baseline risk assessment is not necessary to develop interim alternatives for the source area of the landfill, nor would it allow development and evaluation of less expensive containment alternatives for the source area.

Selection of an interim remedial action for the source area is fully supported by the completed Streamlined Risk Assessment (RA) for Interim Remedial Action, which documents numerous exceedances of comparison numbers that are considered protective of human health and the environment. Based on the results of the RI/FS, the streamlined RA, the evaluation of the alternatives in the Proposed Plan against the nine criteria, and public comments, EPA has selected Alternative 4c as an interim remedial action because it provides the best balance of the nine criteria and is cost effective. Selection of this alternative as an early/interim action is fully consistent with CERCLA, the NCP, and EPA guidance. Completion of a comprehensive baseline risk assessment is not required to make this interim decision.

Contrary to the commentor's assertion, EPA's Presumptive Remedy Guidance for Municipal Landfills provides for EPA to take early and interim response actions, including conducting a streamlined risk assessment, in situations other than those in which chemical-specific groundwater standards have been clearly exceeded. The Presumptive Remedy guidance refers to previously-issued EPA guidances, in particular a February 1991 guidance (OSWER Dir. No. 9355.3-11) entitled "Conducting Remedial Investigations/ Feasibility Studies for CERCLA Municipal Landfill Sites", (EPA, 1991) which in turn references another EPA guidance document issued in September 1990, entitled "Streamlining the RI/FS for CERCLA Municipal Landfill Sites" (EPA, 1990a). The "Streamlining the RI/FS" guidance states as follows:



"When established standards for one or more contaminants in a given medium are clearly exceeded, the basis for taking remedial action is warranted (i.e., quantitative risk assessments that consider all chemicals, their potential additive effects, or additivity of multiple pathways are not necessary to initiate remedial action.)" See "Streamlining the RI/FS for CERCLA Municipal Landfill Sites," OSWER Directive No. 9355.3-11FS, (September 1990), p. 3, (EPA, 1995a).

Clearly, this guidance envisions EPA performing streamlined risk assessments when standards in media other than groundwater are exceeded. In addition, it defies common sense to read the Presumptive Remedy Guidance as narrowly as the commentor suggests. CERCLA contains broad powers which allow the President (through the EPA) to address releases of hazardous substances that potentially or actually threaten human health and the environment. The commentor's narrow reading of CERCLA and the Presumptive Remedy Guidance would tie EPA's hands and prevent EPA from acting quickly under CERCLA and the Presumptive Remedy Guidance to address releases to media other than groundwater. Clearly, in order to be able to protect human health and the environment, EPA must be able to address releases to all media, not just releases to groundwater, even if the action being taken was developed using the Presumptive Remedy Guidance.

- 2.5.3 **Additional Comment Under B.5.:** The commentor was concerned that "Region 10's analysis failed to consider another NCP program management principle, specifically: site specific data needs, the evaluation of alternatives, and the documentation of the selected remedy should reflect the scope and complexity of the site problems being addressed."

**Response:** On the contrary, EPA's approach at the Tulalip Site appropriately considered and implemented this NCP program management principle. As discussed above, the Tulalip Site has been broken into two phases: the first phase will address the source area of the landfill, and the second phase will address the off-source areas of the site. This phased approach was used in order to speed up the remedial process and tailor remedial decision-making to more specific areas of the site.

The June 14, 1995, memorandum from EPA's Office of General Counsel entitled "Presumptive Remedies and NCP



Compliance" was issued in order to explain the relationship of EPA's presumptive remedies initiative for CERCLA sites to the requirements of the NCP, and specifically addresses consistency of the presumptive remedy approach with NCP program management principles such as site specific data needs and evaluation of alternatives. The OGC memorandum supports the presumptive remedy approach taken at the Tulalip Landfill site in selecting a remedy:

"The use of presumptive remedies as part of the remedy selection process at appropriate sites is consistent with the program management principle in 40 C.F.R. § 300.430(a)(1)(ii)(C). That is, using a remedy found to be generally appropriate for a class of sites narrows the scope and complexity of the remaining issues that need to be addressed on a site-specific basis. In other words, presumptive remedies speed up the remedy selection process so that, once site data has been gathered, EPA can begin action more quickly." Id. at p. 4.

\* \* \*

"The identification of presumptive remedies serves, in effect, to carry out the screening and detailed analysis steps in a generic manner that minimizes the need to perform those steps at a site-specific level. In developing a presumptive remedy for a certain type of site, or sites containing a certain type of waste, EPA evaluates technologies that are commonly considered for a certain type of site and identifies one or more technologies as being generally most appropriate..."

"Where circumstances at a site correspond to those for which the presumptive remedy was identified as generally suitable, the generic analysis of the NCP remedy selection criteria that was performed in identifying the presumptive remedy should be adequate, and need not be repeated site-specifically. ... In effect, as will be discussed in more detail below, the materials prepared in the generic analysis will substitute for a broader FS. Similarly, the technology identification and screening steps done for the generic presumptive remedy analysis will



serve as the technology and screening steps for the site at hand." Id. at p. 6.

EPA's intent in using presumptive remedies is to meet NCP requirements in a more efficient and streamlined manner. Presumptive remedies were designed as part of the Superfund Accelerated Cleanup Model (SACM), which in turn is an EPA program management principle designed in response to PRP complaints that the remedy selection process was too lengthy and expensive, and that EPA mandated excessive study prior to the selection of alternatives. In designing presumptive remedies, EPA screened out, up-front, certain alternatives which would be inappropriate for particular types of sites. At the Tulalip Landfill Site, EPA followed the NCP requirements by using a presumptive remedy analysis as the technology and screening steps for the Site. In fact, EPA went beyond the requirements for presumptive remedies at this Site by evaluating alternatives, such as Alternatives 2b and 2b(ii), which do not fall within the traditionally accepted presumptive remedies for landfills. In addition, while 2b and 2b(ii) include the concept of leachate collection, the commentor has not identified sites where this design has been successfully employed in a similar environment as Tulalip.

#### 2.5.4

**Additional Comment under B.5.:** The commentor also states that EPA in the NCP does not discuss when a screening-level risk assessment can be substituted for a baseline risk assessment.

**Response:** As discussed above in Response to Comment 2.1.2, the NCP recognizes that different sites require varying levels of analysis and study prior to the selection of a response action, depending on the approach selected for the site. Specifically, with respect to the scope of the risk assessment, the "Presumptive Remedy for CERCLA Municipal Landfill Sites" (EPA, 1993a) states as follows:

"The municipal landfill manual states that a streamlined or limited baseline risk assessment will be sufficient to initiate response action on the most obvious problems at a municipal landfill (e.g. groundwater, leachate, landfill contents, and landfill gas). One method for establishing risk using a streamlined approach is to compare contaminant concentration levels (if available) to standards that are potential chemical-specific applicable or relevant and



appropriate requirements (ARARs) for the action. The manual states that where established standards for one or more contaminants in a given medium are clearly exceeded, remedial action generally is warranted." See OSWER Dir. No. 9355.0-49FS, Sept. 1993, at p. 4, (EPA, 1993a).

This guidance also addresses the issue of whether a qualitative as opposed to quantitative risk assessment is necessary for an interim remedy at a municipal landfill:

"As a matter of policy, for the source area of municipal landfills, a quantitative risk assessment that considers all chemicals, their potential additive effects, etc., is not necessary to establish a basis for action if ground-water data are available to demonstrate that contaminants clearly exceed established standards or if other conditions exist that provide a clear justification for action." (Emphasis in original).

\* \* \*

"Almost every municipal landfill site has some characteristic that may require additional study, such as leachate discharge to a wetland or significant surface water run-off caused by drainage problems. These migration pathways, as well as ground-water contamination that has migrated away from the source, generally will require characterization and a more comprehensive risk assessment to determine whether action is warranted beyond the source area and, if so, the type of action that is appropriate." (Emphasis added) Id. at p. 5.

EPA has followed this recommended approach in the Streamlined Risk Assessment. The primary conclusion of the Streamlined Risk Assessment is that actual concentrations detected in leachate being released from the landfill significantly exceed comparison numbers that are considered protective of human health and the environment, including specific health-based and ecological standards, criteria, and risk-based concentrations. The NCP's "bias for action" principle leads EPA to implement a response action that will expeditiously reduce this harm rather than wait for a full site-wide characterization of all problems caused



by the landfill and an assessment (which are still under development in order to determine whether additional cleanup actions are necessary for the Tulalip Landfill site). Nothing in the NCP, the preamble to the NCP, or pertinent guidance requires EPA to wait until more studies are completed, or until a comprehensive, quantitative risk assessment is performed, to go forward with its plan for a containment remedy at the Tulalip Landfill site to reduce discharges of leachate. See, also, Response to Comment 2.2.

- 2.5.5 **Additional Comment Under B.5.:** The commentor states that Region 10's reliance on the Presumptive Remedy Guidance to streamline the risk assessment is "misplaced" because promulgated regulations such as the NCP "control" over unilaterally-issued Agency guidance when the regulation and the guidance "conflict", and because the use of a streamlined risk assessment is limited to only those sites where a public health risk is manifest and chemical-specific groundwater standards are clearly exceeded.

**Response:** The commentor claims that the NCP and EPA guidance documents conflict with each other in that the commentor states that the NCP always requires a site-specific baseline risk assessment to be completed before a remedial action is selected. EPA disagrees with the commentor's interpretation of the NCP requirements, and EPA disagrees with the commentor's belief that there is a conflict between the NCP and EPA guidance. As EPA observed in its Response to Comment Section 2.1, the NCP does not require a more comprehensive risk assessment than the one EPA has completed for the Tulalip source area in order to take the type of action that EPA is selecting for the source area of the Site. The NCP does require a balancing process regarding if and when EPA chooses to take early action at a site. This balancing process involves weighing the need for prompt, early actions against the need for definitive site characterization. The preamble to the 1990 revisions to the NCP states:

"EPA expects to take early action at sites where appropriate, and to remediate sites in phases using operable units as early actions to eliminate, reduce or control the hazards posed by a site or to expedite the completion of total site cleanup. In deciding whether to initiate early actions, EPA must balance the desire to definitively



characterize site risks and analyze alternative remedial approaches for addressing those threats in great detail with the desire to implement protective measures quickly. Consistent with today's management principles, EPA intends to perform this balancing with a bias for initiating response actions necessary or appropriate to eliminate, reduce, or control hazards posed by a site as early as possible" (underlining added). 55 Fed. Reg. at 8704 (March 8, 1990).

The Streamlined Risk Assessment that EPA has completed for the source area of the Site, along with the RI/FS for the Site, reflect the nature and complexity of the problem and the response alternatives considered. EPA, in the Proposed Plan and this interim ROD, balanced the need for action based on its evaluation of existing data and the nature of the Site against the need to develop more data as the basis of a more comprehensive risk assessment. EPA determined that the selected containment remedy was appropriate given the risks known to exist at the Site as evaluated in the streamlined RA.

The preamble to the NCP and EPA guidance documents provide more detailed information on how EPA suggests risk assessments may be conducted at Superfund sites of varying scope and complexity. A close examination of these sources shows that the Streamlined Risk Assessment is consistent with EPA's policy for sites of similar scope and complexity to the Tulalip Landfill Site and, does in fact, meet minimum requirements for risk assessment:

"To implement an early action under the remedial authority, an operable unit for which an interim action is appropriate is identified. Data sufficient to support the interim action decision is extracted from the ongoing RI/FS that is underway for the site or final operable unit and an appropriate set of alternatives is evaluated...A completed baseline risk assessment generally will not be available or necessary to justify interim action."

\* \* \*



"Qualitative risk information should be organized that demonstrates that the action is necessary to stabilize the site, prevent further degradation, or achieve significant risk reduction quickly." See 55 Fed. Reg. at 8704 (March 8, 1990) (Emphasis added).

EPA's "Risk Assessment Guidance For Superfund, Volume 1, Human Health Evaluation Manual (Part A)," December 1989 (EPA, 1989a), further elaborates on the principle that varying levels of detail are required in risk assessments, depending on the timing of the action to be taken at a Site:

"Although risk information is fundamental to the RI/FS and to the remedial response program in general, Superfund site experience has led EPA to balance the need for information with the need to take action at sites quickly and to streamline the remedial process. Revisions proposed to the NCP in 1988 reflect EPA program management principles intended to promote the efficiency and effectiveness of the remedial response process. Chief among these principles is a bias for action." See page 1-1.

"Baseline risk assessments are site-specific and therefore may vary in both detail and the extent to which qualitative and quantitative analyses are used, depending on the complexity and particular circumstances of the site, as well as the availability of applicable or relevant and appropriate requirements (ARARs) and other criteria, advisories, and guidances." See page 1-6.

Similarly, in "Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual," March 1989 (EPA, 1989b), EPA advises at page 10 that: "The nature, extent, and level of detail of the ecological assessment will be determined according to the phases of the remedial process, the specific study objectives, and the characteristics of the site and its contaminants."

Thus, it is clear that Region 10's selection of the interim remedial action in the interim ROD is consistent with both the NCP and EPA-issued guidance, and that the NCP and the guidance documents do not conflict with each other.



Regarding the commentor's claims that the streamlined risk assessment is limited to only those sites where a public health risk is manifest and chemical-specific groundwater standards are clearly exceeded, EPA refers the commentor to the "Streamlining the RI/FS for CERCLA Municipal Landfill Sites" (EPA, 1990a) and the "Presumptive Remedy for CERCLA Municipal Landfill Sites" (EPA, 1993a) guidance issued in September of 1990 and September of 1993. Both state that where "established standards for one or more contaminants in a given medium are clearly exceeded, the basis for taking remedial action is warranted." Neither guidance document stated that the "established standards" only refers to chemical-specific groundwater standards. Rather, the Presumptive Remedy Guidance uses an exceedance of groundwater standards as one example of when a presumptive remedy may be considered at municipal landfill sites. In addition, footnote #3 in the Presumptive Remedy Guidance states that if MCLs or non-zero MCLGs are exceeded, a response action generally is warranted. These are given as examples and should not be read as limitations on the triggering of a remedial action pursuant to the presumptive remedy process. Groundwater standards are frequently given as examples because groundwater for drinking water purposes is often one of the media of concern at a landfill. At the Tulalip Landfill, contaminated groundwater is unlikely to impact drinking water supplies, so EPA believes it would not be meaningful to compare Site groundwater data to MCLs or non-zero MCLGs, even though Site data does exceed these values for some chemicals. However, EPA does believe it is appropriate to compare Site data to state and federal surface water standards and criteria, because the Streamlined Risk Assessment and the RI show that contaminated groundwater from the Site discharges directly to surface waters at contaminant levels that exceed the surface water standards and criteria. The commentor did not submit a specific reference in his comments supporting his claim that the use of presumptive remedies is limited to only those sites where there has been an exceedance of groundwater standards.

The commentor goes on to state that the July 26, 1995, letter from Richard McAllister of EPA to Wm. Roger Truitt (McAllister, 1995) confused exceedances of AWQC in the EPA ecological risk evaluation with the Presumptive Remedy Guidance's streamlining trigger for exceedances of health-based drinking water standards during EPA's ecological evaluation in the streamlined RA. Additionally, the commentor implies that because



AWQC are not enforceable criteria, remedial action cannot therefore be based on exceedances of those criteria, and that remedial action can only be based on enforceable drinking water standards. As EPA has previously responded to the commentor, EPA in the Streamlined Risk Assessment used comparison numbers that are considered protective of human health and the environment, including specific health-based and ecological standards, criteria, and risk-based concentrations, when it examined Site data to determine whether there were human health and ecological risks at the Tulalip Site. Thus, any exceedances of the comparison numbers indicated to EPA that there may be a risk associated with those exceedances which required further discussion in the Streamlined Risk Assessment. See also Response to Comment 11.9.

Contrary to the commentor's claim, EPA did not confuse drinking water standards with AWQC in the development of the Streamlined Risk Assessment. EPA believes that it was consistent with CERCLA, the NCP and EPA guidance when it used federal AWQC and state AWQ standards as tools in development of comparison numbers in the Streamlined Risk Assessment.

With regard to the issue of whether federal AWQC can be used to justify remedial action, EPA has determined in the interim ROD that federal AWQC, along with the state of Washington water quality standards for surface water, are important chemical-specific relevant and appropriate ARARs. The AWQC are specifically identified as a potential ARAR in CERCLA Section 121(d)(2)(B)<sup>11</sup>, which states that federal water quality criteria are to be attained "where relevant and appropriate."<sup>11</sup> In addition, AWQ standards that are promulgated by the state of Washington and which are enforceable, have been identified as ARARs that are being exceeded under baseline conditions at the Tulalip Landfill. The interim remedy selected for implementation at the Tulalip Site must satisfy all ARARs identified in the interim ROD for the Site.

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<sup>11</sup> It should be noted that the commentor, in referring to Attachment 11 of his comments in support of his argument that federal "ambient water quality criteria are not rules and have no regulatory impact," relies on a May 1, 1986, EPA guidance document. On October 17, 1986, Congress passed the SARA amendments to CERCLA, in particular Section 121 of CERCLA, which specifically states that federal water quality criteria may be "relevant and appropriate" standards in CERCLA actions. Thus, referencing the May 1, 1986, EPA guidance to support the idea that AWQC are not enforceable under CERCLA is not appropriate.



2.6

**Comment:** "B.6. Region 10's Screening-Level Risk Assessment is Contrary to Congressional Directives and "Common Sense" Superfund Administrative Reforms Announced by EPA Headquarters." [3]

**Response:** The commentor discusses some of the provisions in the U.S. Senate Committee on Appropriations "Committee Report." According to the commentor, the report states that EPA's cleanup budget will be reduced, that Congress will give direction to the Agency to focus its resources on the worse sites first and to modify its risk assessment procedures.

While it is true that EPA's budget, including the budget for the Superfund program, has been the subject of debate, the Agency does not yet have a final budget for this year. Nor has Congress produced any statutory revisions to CERCLA that have progressed to the point of approval in either the House or the Senate. Once a revised CERCLA bill becomes law, the Agency will review its requirements and make any appropriate changes in the Superfund program. At this time, the Agency cannot predict whether changes will need to be made in the way the Agency implements the Superfund program in the future and if those changes will have an effect on the evaluation and implementation of remedial action at the Tulalip Site. The Agency cannot base present decisions and action on draft Congressional bills such as HR 2099 which have not become law. Also, the Agency at present cannot make any predictions regarding the EPA budget directives or anticipate what the final budget will be, how monies will be allocated for what actions, or what the provisions of a re-authorized CERCLA will be. As such, EPA Region 10 will not make changes to the Tulalip Site decision-making process until EPA Headquarters has issued regulations or guidance on how a newly re-authorized CERCLA statute will be implemented and after the Region determines whether these changes would affect the Tulalip Site. For the present, the Region is lawfully and justifiably proceeding with this interim remedial action based on current laws, regulations, and policies. Further our planned action at the Tulalip Landfill is fully consistent with the Superfund Administrative Reforms initiative announced by the Agency on October 4, 1995.

2.6.1

**Additional Comment Under B.6.:** The commentor notes that the AR for this Site does not contain a health assessment conducted by the ATSDR. In addition, the commentor also notes that the Congressional Committee Report directs EPA to only take action when an ATSDR report indicates that a site poses a health hazard.



The commentor also noted that EPA is implementing 20 new administrative reforms to the Superfund program. The commentor cites one of the reforms as being the establishment of national criteria to "reality test" risk assessments conducted by the Superfund program. The commentor goes on to conclude that the risk assessment "must be withdrawn and a proper baseline risk assessment using sound science, current land use and reasonable exposure pathways and assumptions must be performed for the Site."

**Response:** Region 10 will implement new reform policies when the criteria and procedures are in place to do so. The "national criteria" that the commentor refers to in his comment will be incorporated into the Tulalip Site if and when it is appropriate to do so. This current action at the Tulalip Landfill is fully consistent with EPA policy.

ATSDR completed a preliminary health assessment for the Tulalip Landfill Site on June 2, 1993. That ATSDR report did not identify that a health emergency existed at the Tulalip Site. However, the ATSDR report was based upon sampling data and Site information as it existed at the time it was prepared. Since that time, the RI conducted by the Respondents has shown numerous exceedances of comparison numbers used in the Streamlined Risk Assessment. These comparison numbers are considered to be protective of human health and the environment. The Region considered but did not rely upon the information contained in the 1993 ATSDR report when the Region made its interim remedial action decision in the interim ROD for the Tulalip Landfill Site. However, the Region has added the 1993 ATSDR report to the AR for this Site as historical information.

As mentioned above, EPA is unwilling to speculate how any new CERCLA legislation or EPA funding legislation will look in their final form. The Region cannot implement the CERCLA program based upon draft legislation. The Region must continue to implement the CERCLA law as it is currently written, and as directed by EPA guidance and policy. Therefore, the Region disagrees with the commentor's statements that the streamlined risk assessment for the Tulalip Site "must be withdrawn" and that a comprehensive "baseline risk assessment" must be performed before the Region can proceed with this interim remedial action. A comprehensive baseline risk assessment is currently being developed for the Tulalip Landfill Site. EPA expects the comprehensive baseline risk assessment may



be completed in the summer of 1996. The purpose of the comprehensive baseline risk assessment is to evaluate whether additional cleanup measures should be undertaken in the off-source areas to address contamination that has migrated to these areas from the landfill. A comprehensive baseline risk assessment is not necessary to develop interim alternatives for the source area of the landfill, nor would it allow development and evaluation of less expensive containment alternatives for the source area.

2.7        **Comment:** "C. Region 10 Has Developed the Proposed Plan in an Arbitrary, Capricious and Unlawful Manner."<sup>12</sup> [3]

2.7.1     **Additional Comment under C.:** The commentor suggests that the Region failed to act impartially when it selected a cap as part of this interim remedial action. The commentor suggests that the Region had "pre-ordained" that a cap would be the preferred alternative in the Region's development of the Proposed Plan for this interim action.

**Response:** Contrary to the commentor's assertions, the Region did not "pre-ordain" that a landfill cap would be the preferred alternative for containment of the hazardous substances at the Tulalip Landfill. The commentor cites a letter dated May 7, 1993, written by the Region 10 Project Manager and sent to the Tulalip Tribes of Washington, in which the commentor suggests that the Region had "pre-ordained" that a cap would be the preferred alternative. In that letter, Region 10's Project Manager states:

"EPA, in consultation with the [Tulalip] Tribe and the Bureau of Indian Affairs, has determined that the "presumptive remedy" of containment is appropriate for the Site. A "presumptive remedy" means that we expect the final remedy will in some manner contain the landfill wastes through a cap and other appropriate controls. In other words, the RI/FS will not evaluate more expensive

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<sup>12</sup> The commentor listed his comments on page 15 of his October 25, 1995, letter as being under subheading "B", while on page 3 of his letter, he also lists those comments as being under subheading "B". The Region will treat the comments from page 15 to page 29 as being under subheading "C," in order to avoid confusion.



remedial alternatives, such as to excavate, treat or otherwise dispose of the waste materials." (Emphasis added).

\* \* \* \*

"The goal of the containment action will be to attain quickly a cleanup that is protective of human health and the environment. A key component of the containment remedy will be a cap that covers the waste material that is buried at the landfill. The purpose of a cap will be to minimize leachate production by preventing precipitation and surface water from coming in direct contact with the landfill wastes."

The commentor misconstrues the statements made in that letter. Contrary to the commentor's assertions, EPA did not pre-select a landfill cover for Tulalip Landfill prior to issuance of the interim ROD. EPA's presumptive remedy guidance calls for "containment" as the presumptive remedy. The guidance does not dictate that the presumptive containment remedy shall, in every case, consist of a landfill cover. However, the guidance clearly recognizes that in the past, for most municipal landfill-type sites, a low permeability landfill cover was the selected remedy. In addition, page 2 of the guidance document "Presumptive Remedy for CERCLA Municipal Landfill Sites" (EPA, 1993a) states:

"Highlight 1 identifies the components of the presumptive remedy. Response actions selected for individual sites will include only those components that are necessary, based on site-specific conditions."



Highlight 1: Components of  
the Presumptive Remedy:  
Source Containment

- Landfill cap
- Source Area ground-water control to contain plume
- Leachate collection and treatment
- Landfill gas collection and treatment
- Institutional controls to supplement engineering controls

Highlight 1 is reproduced verbatim from the guidance document. Presumptive remedy guidance clearly envisions a low permeability landfill cap as a component of containment, and states that the RI/FS should be streamlined to gather data necessary to support construction of the presumptive remedy. Page 6 of this guidance document states: "[t]herefore, the focus of the RI/FS can be shifted....to collecting data to support design of the containment remedy." The guidance also states that once EPA determines action is necessary, State landfill closure requirements [i.e., the Washington State Minimum Functional Standards codified at Chapter 173-304 of the Washington Administrative Code (WAC)] which are ARARs and are more stringent than federal standards must be either attained or waived. EPA has determined that there is a need for an interim remedial action at Tulalip, and that the Chapter 173-304 standards have been identified as an ARAR in the interim remedial action ROD, and those standards call for the installation of a low permeability cap on the landfill surface. See WAC 173-304-460(3).

Another guidance document, entitled "Streamlining the RI/FS for CERCLA Municipal Landfill Sites" (EPA, 1990a), states on page 4:

"The most practicable remedial alternative for landfills is generally containment.



Figure 3 is a simplified decision tree for identifying the appropriate type of cap." (Emphasis added).

This statement, and other statements throughout the guidance documents on presumptive remedies and municipal landfills, indicates that a streamlined RI/FS, which is what was used at the Tulalip Site, suggests a data collection approach that will provide for early implementation of a containment remedy, which generally will include a landfill cap.

EPA guidance calls for containment of landfill wastes, not necessarily a landfill cap, as the presumptive remedy for municipal landfills. The presumptive remedy guidance does call out capping as an alternative that should be considered as a containment alternative, along with leachate, groundwater, and landfill gas controls. Accordingly, the interim ROD evaluates containment alternatives that do and do not include a low permeability landfill cap. The following alternatives from the ROD do not include a cap: -

- 1 No Action
- 2 Active Seep Interception
- 2b Leachate Collection with Discharge to Treatment Berm
- 2b(ii) Leachate Collection with Discharge to POTW
- 3 Leachate Seep and Groundwater Collection and Treatment

The following alternatives do include a cap:

- 4a Soil Cover with Passive Drainage
- 4b Geosynthetic Cover with Active Drainage
- 4c Geosynthetic Cover with Passive Drainage
- 4d Composite Cover with Passive Drainage
- 5 Cover with Leachate Seep Control
- 6 Cover with Leachate Seep Control and Zone 2 Groundwater Collection/Treatment

EPA devoted a substantial amount of resources, and significantly delayed issuing the Proposed Plan for Interim Remedial Action, to fully evaluate the Respondents' proposed Alternative 2b. EPA received a written proposal from the Respondents regarding Alternative 2b on June 30, 1995, after the final Source Area Containment Feasibility Study had been submitted to EPA on May 5, 1995. Subsequent to the April meeting with the Port of Seattle, EPA met with the Respondents and the Tulalip Tribes and internally several times to



discuss and evaluate Alternative 2b. In order to fully evaluate the technical issues associated with Alternative 2b, EPA delayed issuing the Proposed Plan by at least a month. EPA's written technical evaluation of Alternative 2b is in the form of a Memorandum to The File by Eric Winiecki, dated August 4, 1995, (Winiecki, 1995d) which has been included in the Administrative Record for this interim remedial action. The memorandum includes technical analyses and a revised cost estimate from EPA's technical consultant, Roy F. Weston, Inc. Attached to the memorandum are additional, written technical memoranda from EPA technical staff based on their review of Alternative 2b, including Catherine Massimino (engineer), Glenn Bruck (hydrogeologist), Rene Fuentes (hydrogeologist), Jay Vasconcelos (microbiologist), and Donald Matheny (chemist).

The Respondents collected and analyzed data during the RI/FS in accordance with the RI/FS Work Plan and the RI/FS Field Sampling Plan, and the Quality Assurance Project Plan (QAPP) which were attachments to the RI/FS Administrative Order on Consent. The Respondents actively participated in negotiating the contents of these Plans over a 9-month "scoping" period, and EPA made many changes to the draft Plans based on comments from the Respondents.<sup>13</sup> In accordance with EPA guidance on presumptive remedy guidance, including "Presumptive Remedy for CERCLA Municipal Landfill Sites" (EPA, 1993a), the Plans were developed using a streamlined approach to gather data to support early implementation of a containment remedy at Tulalip Landfill. The data collection described in these Plans is consistent with EPA guidance on gathering data for landfill sites and presumptive remedies, including "Conducting Remedial Investigation/ Feasibility Studies for CERCLA Municipal Landfill Sites" (EPA, 1991). By signing the AOC, the Respondents agreed to do the work described in these Plans which they helped prepare.

The Respondents agreed with this streamlined presumptive remedy approach for the RI/FS at the time they signed the AOC. Section IV of the AOC, entitled "Statement of Purpose,"<sup>14</sup> states:

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<sup>13</sup> In response to EPA's offer to participate in the RI/FS scoping process, some of the Respondents opted to participate, and some declined.

<sup>14</sup> Page 3, Paragraph 7. of the AOC.



"The goal of EPA, Respondents, and the Tulalip Tribe is for construction of the presumptive remedy for this site to begin during the Summer of 1995. Preparation of the design documents and specifications for the response action to implement the presumptive remedy, which will be governed by a separate agreement or an amendment to this Consent Order, may begin prior to completion of the feasibility study of the Source Area Containment. In order to achieve this goal, Respondents, EPA and the Tulalip Tribe recognize that agreement may be required on the conceptual design of one or more of the containment component(s) of the presumptive remedy before the final feasibility study of the Source Area Containment is approved by EPA under this Consent Order."

When they signed the AOC, the Respondents agreed upon a data collection approach that they had extensive participation in developing, and that was consistent with EPA's guidance on presumptive remedies. In fact, the Work Plan for the RI/FS, which was incorporated into the AOC signed by the Respondents, on page 4-1 states that:

"Containment technologies that are applicable to the Tulalip Landfill include capping and control of landfill gas, leachate, and groundwater. A relatively extensive geotechnical investigation has been designed for the RI. Results are expected to facilitate evaluation of detailed containment alternatives and thereby accelerate remedial design and implementation. Additional RI tasks to determine the nature and extent of contamination and the associated risks to human health and the environment are unnecessary for the Tulalip Landfill proper since a presumptive remedy for source control has been selected."

Thus, the Respondents had agreed to the streamlined presumptive remedy approach when they signed the AOC which specifically identified capping as an "applicable containment technology for the Tulalip Landfill."

2.7.2

**Additional Comment Under C.:** The commentor asserts that EPA improperly considered the Tulalip Tribes' future land use plans when selecting Alternative 4c.



**Response:** EPA disagrees with the commentor's assertions that the Region improperly considered the Tulalip Tribes' future land use plans when selecting the interim remedial action in this ROD. See, also, EPA's Response to Comment 11.27. In fact, obtaining Tribal acceptance of the selected interim remedy is, in the case of the Tulalip Landfill Site, one of the nine NCP remedy selection criteria (state acceptance is a modifying criteria) EPA must consider when evaluating remedial alternatives. See Section 104 of CERCLA, 42 U.S.C. § 9604, and 40 C.F.R. §§ 300.430(e)(9)(iii) and 300.515. Moreover, the AOC which was negotiated with the Respondents and the Tulalip Tribes specifically provides for the Tribe to submit its plans for future land use at the Landfill. The purpose of the submittal was to inform EPA and the PRPs so that the Tribes' plan could be considered in the development of alternatives.

On October 19, 1995, the Tulalip Tribes submitted comments during the public comment period for the Proposed Plan that express support for the preferred alternative in the Proposed Plan, and provided reasons for their support. This comment letter is included in the AR for this Site. In general, the Tribes' letter expresses concerns about risks posed by the Site, and describes their views on the effectiveness of the various interim remedial alternatives presented in the Proposed Plan.

Because Tribal acceptance is, in the case of Tulalip Landfill, one of the nine criteria in the NCP against which EPA must evaluate alternatives, EPA is required to consider Tribal support (or lack thereof) when selecting an interim remedy for the site. EPA has considered Tribal support of Alternative 4c in accordance with the requirements of CERCLA and the NCP. However, the commentor seems unclear about the respective roles of EPA and the Tribes with respect to remedy selection. In accordance with CERCLA Section 104 and Executive Order 12580, selection of the interim remedy is solely EPA's decision, not the Tribes'.

Historically, EPA has been criticized for selecting remedies that have, in effect, "placed a fence around the site" and prohibited any future productive use of the site. Accordingly, relatively recent EPA guidance indicates that EPA should consider future land use during the remedy decision process. See "Land Use in the CERCLA Remedy Selection Process", OSWER Dir. No. 9355.7-04 (May 25, 1995), (EPA, 1995c).



EPA notes that it is unlikely that a landfill cover would be selected solely on the basis of a landowner's desire to develop the land. While a landfill cover would allow some limited use or development on the landfill surface, a landfill surface is not an ideal surface for future development and significant restrictions are often necessary to prevent damage to the cover system. Accordingly, the selected remedy includes institutional controls to prevent damage to the cover system. When design and construction of the interim remedy are complete, EPA and the Tulalip Tribes shall develop a document entitled "Routine Use of Tulalip ('Big Flats') Landfill" (Tulalip Tribes, 1994), to ensure the continued integrity of the cover system. Any future commercial or development activity on the landfill surface will require advance, written agreement between EPA and the Tribes to ensure the continued integrity of the cover system. See Section 10.1 of the ROD for further details.

2.8      **Comment:** "C.1. The Proposed Plan's Focus On Reducing Leachate Discharges Is Inconsistent With Region 10's Failure to Enforce the Clean Water Act at the Site Since 1986." [3]

2.8.1    **Additional Comments Under C.1.:** The commentor believes that the Region acted in an arbitrary and capricious manner by failing to enforce the Tribe's NPDES permit which prohibits discharges of pollutants into navigable waters unless authorized by a permit issued pursuant to Section 402 of the Clean Water Act (CWA), and instead selecting a remedy in the Proposed Plan which has as a primary objective reduction of leachate from the landfill. [8] [18]

**Response:** The Region disagrees with the commentor's assertions that the Region acted inconsistently under the CWA and CERCLA with respect to enforcement of the Tribes' NPDES permit versus proceeding with remedial action under CERCLA.

EPA's obligation to take enforcement actions for violations of NPDES permits is wholly discretionary. EPA is not required by the statute to take enforcement action against a person who is in violation of a permit because effluent standards or limitations are being exceeded according to the terms of the permit. EPA has been given the discretion to decide whether to use the enforcement powers under the CWA against violators of NPDES permit conditions. The Agency was given this discretion in order to be able to use all of its



"tools", such as remedial action under CERCLA, in deciding what is the best way to respond to releases of hazardous substances from a site. In some cases, enforcement of existing permit conditions may be the best way to effectuate a timely and adequate response to such a release of hazardous substances. In other cases, pursuit of an enforcement case under the CWA may result in needless delays due to litigation, which would have the untenable result of allowing the discharges of hazardous substances to continue pending the outcome of such litigation.

In the case of the Tulalip Landfill, EPA Region 10 decided that the use of its CERCLA remedial action tools, rather than its enforcement tools under the CWA, to address the releases of hazardous substances was the best use of limited Agency resources and was the most timely and cost-effective method available to the Agency at the time that decision was made. By using CERCLA, EPA is addressing the source of the discharge and preventing future generation of leachate.

In addition, Section 505 of the CWA permits any citizen to commence a civil action against any person allegedly in violation of an effluent standard or limitation or an order issued by EPA regarding such a standard or limitation. This citizen suit provision is meant to provide a measure of policing of NPDES permit compliance in the absence of the use of EPA's discretionary enforcement authority for NPDES permit noncompliance.

This commentor, in fact, utilized the citizen suit provision of the CWA by bringing suit on behalf of his clients, who are Respondents to the RI/FS AOC, against the Tulalip Tribes of Washington and Federal defendants. The claims were based on violations of the Tribes' NPDES permit. The Court dismissed the commentor's clients' claims based on the jurisdictional bar of Section 113(h) of CERCLA.

The commentor, in his clients' citizen suit action, asked the Court to enjoin further unpermitted discharges of pollutants from the landfill and to require compliance with the terms of the Tulalip Tribes' NPDES permit. The commentor further asked the Court to order EPA to enforce the CWA against the Tulalip Tribes and BIA, including enforcing the terms of the expired NPDES permit. As the United States argued in its brief for the United States of Appeals in Josie Razore and John Banchemo v. The Tulalip Tribes of Washington, No. 94-35985 (9th Cir), at page 26, "There



is no way to stop discharges from the landfill, or to bring the site into compliance with the terms of the expired NPDES permit, without undertaking some sort of response action."

EPA, relying on its technical expertise and enforcement discretion, chose not to address the leachate problem through enforcement of the CWA, but rather, chose to address the environmental problems at the Site by developing an appropriate response action under CERCLA. CERCLA was specifically established to provide a comprehensive statutory scheme to address and accomplish the cleanup of actual or threatened releases of hazardous substances. It was under CERCLA that EPA believed the most comprehensive and technically viable response could be developed to address the leachate problem as well as the other environmental problems at the Site. EPA maintains that this is the most rational and responsible approach given the Agency's various legal authorities, and is confident that the alternative it has selected in the ROD to address Source Area contaminants is the most viable after taking into consideration all required factors.

The commentor also refers to a Region 9 Superfund Site in support of his contention that the Region 9 Site is "remarkably similar" to the Tulalip Landfill. Since the Region 9 Site ROD specified "no-action," the commentor suggests that Region 10 is being inconsistent in requiring "action" to be taken at the Tulalip Landfill. Region 10 disagrees with the commentor's description of the Region 9 Site being "remarkably similar" to the Tulalip Landfill. The Region 9 Site is the Ordot Landfill in Guam. That Site is an operating municipal landfill. Tulalip is not an operating landfill. The Ordot Site "no action ROD" stated that CERCLA action was "inappropriate at this time" (emphasis added) "based on several facts," which were as follows:

- "1) the Ordot Landfill is an operating municipal landfill;
- 2) all but approximately 4 to 7 acres of the 47 acre site are active waste disposal areas;
- 3) the 4 to 7 inactive acres are down-gradient of the active waste disposal areas or are immediately adjacent to active waste disposal areas;
- 4) any remedy for the inactive areas will likely be affected by activities at the active waste disposal areas or continued surface flows through the landfill;



5) the bulk of any environmental impacts from the landfill will result from activities at the active waste disposal area;

6) the landfill, by applying standard operation practices to control landfill leachate, can effectively reduce or eliminate the surface flow of leachate to receiving waters;

7) EPA has issued an order under the Clean Water Act that requires the Guam Department of Public Works to cease discharge of leachate from the landfill to the nearby river; and

8) EPA data, although too limited for comprehensive conclusions, has not demonstrated any imminent and substantial endangerment to human health or welfare or the environment."

"EPA concludes that threats to human health and the environment currently identified at the landfill are due to poor operation practices and can best be mitigated through addressing operations and maintenance of the landfill itself including improved leachate control measures consisting of capping and surface water control. EPA concludes that the appropriate mechanism for implementing these controls is through enforcement of the Clean Water Act. The responsibility for implementing these controls lies with the landfill operator, the territory of Guam. Expenditures from the Superfund for these purposes are not appropriate. Further, EPA concludes that any remedial action to address the inactive portion of the landfill potentially appropriate for response under CERCLA would be jeopardized or nullified unless operation practices at the active disposal areas are improved to reduce leachate formation and prevent discharge of leachate. The design for improved operations at the active disposal areas must consider the inactive portion due to the nature of the site and thus would make a separate CERCLA remedial action unnecessary." (Emphasis added) (Winiecki, 1995a, Attachment M, at p.1 & 2).

The differences between the Tulalip Landfill and the Ordot Landfill are great. The Ordot Landfill is primarily an operating municipal landfill with the primary concern being leachate coming from the active waste disposal areas through a surface water pathway. EPA Region 9 found that "the surface flow through the landfill is the source of the leachate, the site is hydrologically isolated from the island's sole-source aquifer, there is an absence of organic contaminants,



inorganic contamination is below the appropriate MCLs, and no air quality problems exist" (Winiecki, 1995a, Attachment M, at p. 2). In contrast, at Tulalip, the landfill ceased operations in 1979, and the leachate is being generated as a result of infiltration of precipitation and is discharging to both surface waters and groundwater. In addition, a cap was identified as one of the necessary components of the remedy under the Clean Water Act at the Ordot Landfill.

Further, unlike the Ordot Landfill, the Tulalip Landfill is hydrologically connected to both the groundwater and the surface waters and is adjacent to sensitive wetlands. There are numerous exceedances of comparison numbers that are considered to be protective of human health and the environment at the Site in all media sampled during the RI. These comparison numbers include standards, criteria and risk-based chemical concentrations that are protective of human health and the environment for this interim remedial action. Thus, it is abundantly clear that the Ordot Landfill and the Tulalip Landfill are not "remarkably similar", and that the commentor's comparisons of the Tulalip Landfill to the Ordot Landfill are without merit.

It is also clear that one of the primary reasons Region 9 chose a no action alternative was the fact that the operating areas of the Ordot landfill would adversely affect any remedial action EPA would have mandated for the small inactive areas of the Ordot Landfill. In fact, the no action ROD for the Ordot Landfill states that EPA will continue to monitor the effectiveness of measures taken by Guam<sup>15</sup> to install the proper leachate collection systems and capping, and that "[i]n choosing the no action alternative EPA reserves its authority to perform additional response actions should the new information warrant such a decision." Thus, EPA Region 9 recognized the fact that it may yet have to take action at the Ordot Landfill in order to protect human health and the environment.

2.8.2

**Additional Comment Under C.1.:** The commentor, in his footnote #28, states that there are other Region 10 documents which "believe the Proposed Plan's expressed concern with leachate discharges from the Site." The commentor goes on to suggest that these previously-drafted Region 10 site documents indicate that the risks posed by the Site are not as serious as the Region has indicated in the Proposed Plan.

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<sup>15</sup> The territory of Guam concurred on this no-action ROD.



**Response:** The interim action ROD determines that discharges from the landfill, if not addressed, may present an imminent and substantial endangerment to human health and the environment. This determination is based on relatively recent RI/FS documents, including the final Remedial Investigation (RI) report, the Revised Feasibility Study for Source Area Containment (FS), and the Risk Assessment for Interim Remedial Action (Streamlined Risk Assessment). The Streamlined Risk Assessment documents numerous exceedances of comparison numbers that are considered to be protective of human health and the environment at the Site in all media sampled during the RI. These comparison numbers include standards, criteria and risk-based chemical concentrations that are protective of human health and the environment for this interim remedial action. The geological and hydrogeological information contained in the RI, in combination with the Risk Assessment which shows landfill contaminants which are common across various media, indicate that the landfill is a source of chronic contamination to the surrounding sensitive environment. Based on this information, EPA appropriately concludes that contaminant discharges from the landfill may present an imminent and substantial endangerment to human health and the environment.

The commentor appears to be referring specifically to a "removal assessment" written by Bill Glasser, dated April 22, 1992 (Glasser, 1992). A copy of this document is included in the AR for this Site. Contrary to the commentor's interpretation, this document does not state that no further action is necessary at the Site. Rather, the document states that signs are necessary to warn people from using the landfill and surrounding areas, and notes that Mr. Glasser observed "no imminent or acute threats to human health or environment" at that time, based on his inspection of the Site and the information available to him at that time.

Removal assessments are typically conducted at all NPL sites early in the CERCLA process, and thereafter on a periodic basis. The purpose of a removal assessment is to assess whether any emergency actions need to be taken at a site prior to the start of the RI/FS. Mr. Glasser's use of the word "acute" is indicative of the nature of the removal assessment document as evaluating the need for any emergency response actions.

The removal assessment states that "no further action by the removal program is recommended." [emphasis



added]. At the time this document was written, Mr. Glasser was acting in his capacity as an On-Scene Coordinator (OSC) for the EPA Region 10 removal program. The purpose of the removal program is to conduct emergency removal actions. Emergency removal actions are often conducted at Superfund sites early in the CERCLA process to address any acute threats that constitute an emergency situation, to stabilize the site so that the longer-term remedial investigation/feasibility study and remedial design/remedial action processes can continue at the Site without endangering the lives of Site workers, or people using the areas near the Site. The conclusion of an OSC under the removal program and in particular, Mr. Glasser's decision as an OSC at the Tulalip Site, that no emergency actions are necessary at a given point in time to stabilize at Site in no way implies that the Site poses no risk which may require remedial action under CERCLA.

At the time Mr. Glasser prepared this document, he did not have access to the results of the RI, the source area containment FS, or the streamlined Risk Assessment. Presently, based on the results of the RI/FS and Streamlined Risk Assessment, EPA concludes that the Site may pose an imminent and substantial endangerment to human health and the environment. This finding suggests that action should be taken to contain discharges at the Site in a prompt and effective manner; however, discharges at these levels do not constitute an emergency situation that requires an immediate response.

EPA notes that Mr. Josie Razore and Mr. John Banchemo, represented by the commentor, filed a motion in the Ninth Circuit for an emergency injunction ordering the Tulalip Tribes to immediately control leachate discharges at the Site because these leachate discharges were causing "irreparable harm" to the environment. The commentor's arguments to the Ninth Circuit on behalf of the AOC Respondents with regard to irreparable harm caused by leachate discharges from the landfill support EPA's decision to take an interim remedial action at the Site.

2.9

**Comment:** "C.2. Region 10 Has Arbitrarily Denied the Respondents' Requests to Test the Surface of the Landfill." [3]

**Response:** EPA has never denied the Respondents' request to test the surface of the landfill. EPA has declined to enter into discussions with the Respondents



to amend the RI/FS Work Plan to provide for the collection of this data under the RI/FS AOC.

The Respondents initiated a formal dispute under the RI/FS AOC with respect to their request for additional surface sampling. This dispute is documented in the AR for this interim remedial action. On August 4, 1995, the EPA Region 10 Branch Chief, in accordance with the RI/FS AOC dispute resolution procedures, issued the following Determination regarding the Respondents' request to conduct additional work, including additional surface sampling (Gearheard, 1995a):

**"Tulalip Landfill Administrative Order  
on Consent (AOC) Dispute Resolution  
Branch Chief's Determination on the  
Request for RI/FS Work Plan Modifications"**

**"Issues Under Dispute:**

The parties to the AOC have been unable to resolve a dispute which has arisen over the Respondents request to modify the Remedial Investigation/Feasibility Study (RI/FS) Work Plan at the Tulalip Landfill Superfund Site. The modifications requested include the collection of additional data to further characterize contaminant concentrations in surface water near the Site, and to further characterize contaminant concentrations in soil and standing water at the landfill. The respondents would use this information to support the Revised Source Area Containment-4 Feasibility Study (SAC-4 FS) alternatives."

"EPA notified the Respondents that the Agency is not willing to amend the RI/FS Work Plan. The Respondents have objected to the Agency's reasons for not amending the work plan. The Agency's reasons include:

1. The Respondents have had ample opportunity to identify the need for any additional work to support the SAC-4 FS prior to submitting the SAC-4 FS report;
2. The request for additional work contradicts the Respondents own draft RI Report, which concludes that no further work is needed to complete the SAC-4 FS;



3. The proposal for additional work is structurally flawed and contains technical deficiencies; and
4. Collection of the additional data would result in delay of cleanup at the site."

#### **"Background**

The Respondents signed an Administrative Order on Consent (AOC, EPA Docket No. 1093-08-01-104/106) to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the site. Pursuant to this AOC, the Respondents agreed to conduct work in accordance with a Work Plan for the RI/FS which was structured in accordance with the presumptive remedy of containment for the source area. Data collection for the RI began in November 1993. The draft RI was submitted on February 4, 1995. The FS (SAC-4 report) was submitted on February 13, 1995. The Respondents then submitted a request to amend the RI/FS work plan on February 23, 1995. The requested amendment included the collection of additional soil and water data supporting the Respondents opinion that the surface of the landfill, contrary to EPA's position, does not present a risk to human health or the environment, and that groundwater discharges to the slough could achieve Ambient Water Quality Criteria (AWQC). EPA denied the request to modify the work plan on April 12, 1995."

"In accordance with paragraph 61 of the AOC, the parties have tried to resolve this dispute informally without success. The respondents served on EPA a notice of dispute (letter of Wm. Roger Truitt dated April 26, 1995). EPA and the Respondents met on May 11, 1995, but no agreement was reached. On August 4, 1995, the Respondents submitted a request for the Branch Chief's determination on the dispute. The Branch Chief's determination follows:



## Determination

1. The Respondents have had ample opportunity to identify the need for any additional work to support the SAC-4 FS prior to submitting the SAC-4 FS;

The Respondents contend that the AOC allows the Respondents to identify the need for additional work at any time during the RI/FS process. The Respondents further contend that it was EPA comments in a February 3 letter on the SAC-4 report which identified the need for additional work. The Respondents objected to EPA's determination that the appropriate time to submit this request was before issuance of the (SAC-4) FS, since they had just received EPA's comments.

EPA's position is that the Respondents were erroneous in their conclusion that comments provided by EPA (as noted in your letter dated February 23, 1995) identified the need for additional data. To the contrary, EPA has determined that sufficient information has been collected to date in order for EPA to make a decision on an appropriate, protective remedy, and that further data collection is unnecessary.

Regardless of the erroneous conclusion made by the Respondents which is the basis for their request, the AOC states that EPA, in its discretion, will determine whether the additional data will be collected. Pursuant to this discretion, EPA has determined that the additional data will not be collected at this time. The appropriate time to identify the need for data collection would have been earlier in the process, (e.g., during the Remedial Investigation) so that the data could have been incorporated into the SAC-4 report without delay. The Respondents did not do so. As it is, sufficient data has already been collected by the Respondents and EPA has decided that the requested additional data shall not be collected at this time.